



Office of
Energy
Projects

May 2013

FERC/EIS-D-0244

**Draft Environmental Impact Statement
For Hydropower License**



**Drum-Spaulling Hydroelectric Project
Project No. 2310-193 – California**

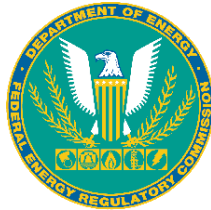
**Yuba-Bear Hydroelectric Project
Project No. 2266-102 – California**

**Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, DC 20426**

**DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE**

Drum-Spaulding Hydroelectric Project—FERC Project No. 2310-193
Yuba-Bear Hydroelectric Project—FERC Project No. 2266-102

California



Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, DC 20426

May 2013

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FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426

OFFICE OF ENERGY PROJECTS

To the Agency or Individual Addressed:

Reference: Draft Environmental Impact Statement

Attached is the draft environmental impact statement (draft EIS) for the Drum-Spaulding Hydroelectric Project (Project No. 2310-193) and the Yuba-Bear Hydroelectric Project (Project No. 2266-102), located on the Middle Yuba, South Yuba, and Bear Rivers and the North Fork of the North Fork American River in Sierra, Nevada, and Placer Counties, California.

This draft EIS documents the view of governmental agencies, nongovernmental organizations, affected Indian tribes, the public, the license applicant, and Federal Energy Regulatory Commission (Commission) staff. It contains staff evaluations on the applicants' proposals and alternatives for relicensing the Drum-Spaulding and Yuba-Bear Projects.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The draft EIS will be part of the record from which the Commission will make its decision. The draft EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or about May 24, 2013.

Copies of the draft EIS are available for review in the Commission's Public Reference Branch, Room 2A, located at 888 First Street, N.E., Washington DC 20426. The draft EIS also may be viewed on the Internet at www.ferc.gov/docs-filing/elibrary.asp. Please call (202) 502-8222 for assistance.

Any comments should be filed by July 23, 2013, and should reference Project No. 2310-193 and/or 2266-102. Comments may be filed electronically via the Internet. See 18 Code of Federal Regulations 385.2001(a)(1)(iii) and the instructions on the commission's web site: <http://www.ferc.gov/docs-filing/elibrary.asp>. Commenters can submit brief comments up to 6,000 characters without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/ecomment.asp>. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support. Although the Commission strongly encourages electronic filing, documents may also be paper-filed. To paper-file, mail an original and five copies to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, DC 20426.

Attachment: Draft Environmental Impact Statement

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COVER SHEET

- a. Title: Relicensing the Drum-Spaulding Hydroelectric Project, FERC Project No. 2310-193 and the Yuba-Bear Hydroelectric Project, FERC Project No. 2266-102
- b. Subject: Draft Environmental Impact Statement
- c. Lead Agency: Federal Energy Regulatory Commission
- d. Abstract: The Drum-Spaulding Project (FERC No. 2310-193) is located in Nevada and Placer Counties, California. The existing project affects 978.3 acres within the Tahoe National Forest, which is administered by the U.S. Department of Agriculture, Forest Service; 5.1 acres that are administered by the U.S. Department of the Interior, Bureau of Reclamation; and 10.6 acres that are administered by the U.S. Department of the Interior, Bureau of Land Management.

Pacific Gas & Electric (PG&E) proposes to retire Alta powerhouse unit 2; modify flow-release facilities; decommission the Jordan Creek diversion; build new recreation facilities; rehabilitate existing recreation facilities; modify the project boundary to include all of part of project trails and primary project roads; and implement measures to protect and enhance environmental conditions, including proposed minimum flow releases. PG&E also proposes to split the current Drum-Spaulding Project into two new licensed projects: the Deer Creek Project and the remaining Drum-Spaulding Project without the Deer Creek Project facilities.

The staff's recommendation is to relicense the projects as proposed, with certain modifications, and additional measures recommended by the agencies.

The Yuba-Bear Project (FERC No. 2266-102) is located in Sierra, Nevada, and Placer Counties, California. The existing project occupies 1,540.8 acres within the Tahoe National Forest administered by the Forest Service and 208.5 acres that are managed by the Bureau of Land Management.

Nevada Irrigation District (NID) proposes to construct one new powerhouse on NID-owned land adjacent to the existing Rollins powerhouse; add five new streamflow gages; replace, upgrade, or install new recreation facilities; decommission two non-project roads; modify the project boundary to encompass some roads and recreation areas; and implement measures to protect and enhance environmental conditions, including proposed minimum flow releases.

The staff's recommendation is to relicense the projects as proposed, with certain modifications, and additional measures recommended by the agencies.

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- f. Transmittal: This draft environmental impact statement to relicense the Drum-Spaulding Hydroelectric Project and the Yuba-Bear Hydroelectric Project is being made available for public comment on or about May 24, 2013, as required by the National Environmental Policy Act of 1969¹ and the Commissions Regulations Implementing the National Environmental Policy Act (18 CFR, Part 380).

¹ National Environmental Policy Act of 1969, amended (Public Law [Pub. L.] 91-190, 42 United States Code [U.S.C.] 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), September 13, 1982).

FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)² and the U.S. Department of Energy Organization Act,³ is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric development subject to its jurisdiction, on the necessary conditions:

That the project adopted...shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e)...⁴

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.⁵ Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.⁶

² 16 U.S.C. §§ 791(a)-825(r), as amended by the Electric Consumers Protection Act of 1986, Pub. L. 99-495 (1986), the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

³ Pub. L. 95-91, 91 Stat. 556 (1977).

⁴ 16 U.S.C. § 803(a).

⁵ 16 U.S.C. § 803(g).

⁶ 18 CFR § 385.206 (2012).

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ACRONYMS AND ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
APLIC	Avian Protection on Powerline Interaction Committee
ARPA	Archaeological Resources Protection Act
ATL	Advisory Tissue Level
Basin Plan	Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	biological opinion
BP	before present
°C	degrees Celsius
Cal Fire	California Department of Forestry and Fire Protection
California Boating	California Department of Boating and Waterways
California Fish and Wildlife	California Department of Fish and Wildlife
California Water Board	California State Water Resources Control Board
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CFR	Code of Federal Regulations
CFR model	channel flow response model
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corp	Corporation
CZMA	Coastal Zone Management Act
DFA	Demonstration Flow Assessment
DO	dissolved oxygen
DPS	distinct population segment
DWR	Department of Water Resources
EFH	essential fish habitat
EIS	Environmental Impact Statement
El.	elevation
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESA	Endangered Species Act
ESU	evolutionarily significant unit
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture Forest Service
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
GWh	gigawatt-hours
HEA	habitat exceedance analysis
HEC	Hydrologic Engineering Center
HFAM	Hydrocomp Forecast and Analysis Modeling
HPETP	Historic Properties Evaluation and Treatment Plan
HPMP	Historic Properties Management Plan
HPTP	Historic Properties Treatment Plan
I-80	Interstate 80
IBI	index of biotic integrity

IFIM	instream flow incremental methodology
Interior	U.S. Department of the Interior
kV	kilovolt(s)
LRMP	Land and Resource Management Plan
LWD	large woody debris
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MCL	maximum contaminant level
mg/L	milligram(s) per liter
MMI	multi-metric index
mph	mile(s) per hour
msl	mean sea level
MW	megawatt(s)
NAGPRA	Native American Graves Protection and Repatriation Act
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NFS	National Forest System
NGVD29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NID	Nevada Irrigation District
NMFS	U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NTU	nephelometric turbidity units
O&M	operation and maintenance
OEHHA	California Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
PA	Programmatic Agreement
PAOT	people-at-one-time
PCWA	Placer County Water Agency
PG&E	Pacific Gas and Electric
ppm	parts per million
RD	recreational day
Reclamation	Bureau of Reclamation
ResSim	Reservoir Simulation
RM	river mile
ROS	Recreation Opportunity Spectrum
RPS	Renewable Portfolio Standards
RV	recreational vehicle
SCA	Site Condition Assessment
SD1	scoping document
SD2	revised scoping document
SHPO	State Historic Preservation Officer
SMCL	secondary maximum contaminant level
SSTEMP	Stream Segment Temperature
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Office
U.S.C.	United States Code
UAIC	United Auburn Indian Community
USGS	United States Geological Survey
VAOT	vehicles-at-one-time
VELB	valley elderberry longhorn beetle
VQO	visual quality objective

VRC
WECC
WUA
YCWA

Visual Resource Class
Western Electricity Coordinating Council
Weighted Useable Area
Yuba County Water Agency

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EXECUTIVE SUMMARY

DRUM-SPAULDING PROJECT

Proposed Action

On April 12, 2011, Pacific Gas and Electric (PG&E) filed an application for a new major license to operate and maintain the Drum-Spaulding Hydroelectric Project (Project No. 2310) and to retire its Alta powerhouse unit 2 that would reduce the project's licensed capacity from 192.5 megawatts (MW) to 191.5 MW. The project includes 10 developments located on the South Yuba River, the Bear River, and the North Fork of the North Fork American River in Nevada and Placer Counties, California. The project occupies 994.0 acres of federal land: 978.3 acres within Tahoe National Forest, which is administered by the U.S. Department of Agriculture, Forest Service (Forest Service); 5.1 acres administered by the U.S. Department of the Interior (Interior), Bureau of Reclamation (Reclamation); and 10.6 acres administered by the Interior, Bureau of Land Management (BLM).

Project Description

The Drum-Spaulding Project developments include: Spaulding No. 3 (5.8 MW installed capacity), Spaulding No. 1 and No. 2 (11.4 MW installed capacity), Deer Creek (5.7 MW installed capacity), Alta (2 MW installed capacity), Drum No. 1 and No. 2 (105.9 MW installed capacity), Dutch Flat No. 1 (22 MW installed capacity), Halsey (11 MW installed capacity), Wise (14 MW installed capacity), Wise No. 2 (3.2 MW installed capacity), and Newcastle (11.5 MW installed capacity). Among these 10 developments, there are 29 reservoirs; 6 major water conduits; 12 powerhouses; 6 transmission lines; 1 distribution line; and appurtenant facilities and structures, including recreation facilities. Each of the developments is described further in section 2.1.1.1, *Existing Project Facilities, Drum-Spaulding Project*, of this draft environmental impact statement (EIS).

Proposed Facilities

PG&E proposes some modifications to existing project facilities, most notably, the permanent retirement of Alta powerhouse unit 2, which has not operated since 2007. PG&E also proposes to remove the Jordan Creek diversion and associated conveyance system, which are not needed for project operation and have not been used for many years.

Finally, PG&E proposes to remove the Deer Creek Development from the project and operate it as a separate project without any changes in facilities or operation.

PG&E proposes to build new recreation facilities and rehabilitate existing facilities at the following areas: Meadow Lake, Lake Sterling, Fordyce Lake, Lake Spaulding, Lower Lindsey Lake, Fuller Lake, Lower Peak Lake, Lake Valley reservoir, and Wise forebay.

Proposed Operation

PG&E proposes to modify project operations affecting minimum streamflows, spills from project canals and conduits, and the rate of flow fluctuations following spill events to provide environmental benefits to project affected resources as described below. In conjunction with these flow modifications, PG&E also proposes the following new or modified flow-release facilities:

- Spaulding dam—modify Lake Spaulding dam low-level outlet to release a minimum streamflow of 90 cubic feet per second (cfs), add control valves, improve gage YB-29, and modify and improve control systems.
- Lake Valley reservoir dam—modify gage YB-104 for full flow, add energy dissipater, and modify downstream channel; Towle canal diversion dam—modify existing gates to release increased minimum streamflow of 3 cfs and modify existing weir.

- Drum canal at YB-137—install minimum flow release control orifices to release 1 to 2 cfs to Bear River upstream of Drum afterbay.

Proposed Environmental Measures

PG&E proposes the following environmental measures.

General Measures

- Consult annually with the Forest Service, BLM, and Reclamation to review operations and monitoring data from the prior year and conduct planning for ongoing project operations.
- Conduct annual employee training to familiarize staff with special status species, noxious weeds, and sensitive areas known to occur within the project boundary on Forest Service, BLM, or Reclamation land, and the procedures for reporting to each agency.
- Implement a Coordinated Operations Plan for the Drum-Spaulding and Yuba-Bear Projects regarding implementation of flow-related measures in each project's license.

Geology and Soils

- Implement an Erosion Control and Slope Maintenance Plan to minimize and control project-related erosion; the plan would provide for project-wide implementation of best management practices (BMPs) to control erosion and sedimentation and more specifically include an inventory and prioritization of erosion sites on steep slopes below open project canals and spill structures and implementation of repair and restoration plans, as necessary.
- During winter to minimize potential adverse effects of high flows on channel morphology, bank stability, and aquatic and riparian habitat of the Bear River: limit operational flow releases from the Drum canal; implement ramping rates; and limit water spilled from the Drum canal to the upper Bear River through Bear Valley Meadow when the Drum afterbay is forecast to spill and the Dutch Flat no. 1 and no. 2 powerhouses are fully loaded.
- During facility outages that last more than 30 days: operate multiple spill gates from the Drum canal to more evenly distribute flows through Bear Valley Meadow; implement a 2-day ramping rate; and notify the appropriate agencies.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98.
- To enhance aquatic habitat and protect resident aquatic species, provide the same or increased minimum streamflows to eight project-affected reaches and provide new minimum streamflows to five project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Fordyce Creek – below Fordyce Lake dam	3-115
South Yuba River – below Kidd Lake dam and Lower	3-120

Project-Affected Reach	Table No. in Appendix A-2
Peak Lake dam	
South Yuba River – below Lake Spaulding dam	3-121
North Fork of the North Fork American River – below Lake Valley Reservoir dam	3-126
North Fork of the North Fork American River – below Lake Valley canal diversion dam	3-129
Bear River – at Highway 20 crossing	3-133
Bear River – below Drum afterbay	3-140
Dry Creek – below Halsey afterbay dam	3-142
Rock creek – below Rock Creek diversion dam	3-143
Mormon Ravine	3-146
South Fork Deer Creek – below Deer Creek powerhouse	3-125
Canyon Creek – below Towle canal diversion dam	3-136
Little Bear River – below Alta powerhouse tailrace	3-139

- Periodically set the low-level outlet at 16 remote project dams to provide the same or increased minimum streamflows in nine project reaches and new minimum streamflows in seven project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Texas Creek – below Upper Rock Lake dam	3-102
Texas Creek – below Lower Rock Lake dam	3-103
Unnamed tributary – below Culbertson Lake dam	3-104
Lindsey Creek – below Middle Lindsey Lake dam	3-105
Lindsey Creek – below Lower Lindsey Lake dam	3-106
Lake Creek – below Feeley Lake dam	3-107
Lake Creek – below Carr Lake dam	3-108
Rucker Creek – below Blue Lake dam	3-109
Rucker Lake – below Rucker Lake dam	3-110
Unnamed tributary – below Fuller Lake dam	3-111
Unnamed tributary – below Meadow Lake dam	3-112
White Rock Creek – below White Rock diversion dam	3-113
Bloody Creek – below Lake Sterling dam	3-114

Project-Affected Reach	Table No. in Appendix A-2
Unnamed tributary – below Kidd Lake dam	3-118
Cascade Creek – below Lower Peak Lake dam	3-119
Sixmile Creek – below Kelly Lake dam	3-128

- Notify licensing participants at the annual consultation meeting of all annual planned and non-routine planned canal outages. Implement modified minimum streamflows in project canal-affected stream reaches during the first 30 days of canal outages, as shown in appendix A-2, table 3-181. For canal outages anticipated to extend past 30 days, consult with agencies and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage. Drum and Bear River canals would not be taken out of service at the same time.
- Coordinate operations with the Yuba-Bear Project at Rollins dam and Bear River canal diversion dam to ensure maintenance of minimum streamflows downstream in the lower Bear River.
- To expand recreational whitewater boating opportunities and support Supplemental Flow releases downstream from Lake Spaulding to the South Yuba River, draw down Fordyce Lake beginning in late spring with an initially high target flow (250 to 450 cfs) until the lake reaches 29,000 acre-feet of remaining storage and then make equally apportioned releases throughout the rest of the year to reach an end-of-year storage of 7,500 to 10,000 acre-feet.
- Construct and operate two 1-cfs flow release devices near the existing spillway at the Drum canal to provide controllable minimum streamflows to the Bear River upstream of the Drum afterbay.
- To reduce the risk of stranding of aquatic resources below Lake Spaulding dam, adhere to Lake Spaulding spill cessation schedules and minimize flow fluctuations in the South Yuba River below Lake Spaulding, as shown in appendix A-2, table 3-182 and table 3-183.
- Implement a Fish Protection and Management During Canal Outages Plan to minimize fish losses when canals are drained for maintenance and repair.
- Pay up to a maximum of \$15,000 per year to the California Department of Fish and Wildlife (California Fish and Wildlife) for fish stocking in Lake Spaulding to support recreational angling, provided such stocking is performed.
- Design and install new or modify existing streamflow gages to measure new minimum streamflows, as shown in appendix A-2, table 3-188.
- Provide minimum streamflows and canal outage minimum flows in Auburn Ravine below the Wise and Wise No. 2 Developments and South canal release point, as shown in appendix A-2, table 3-144, to protect and enhance resident aquatic resources and their habitat.

- Set the low-level outlet at 16 remote project dams on a periodic schedule to comply with proposed minimum streamflows.
- Implement an Aquatic Monitoring Plan to assess the effects of the proposed flow modifications on aquatic resources in selected project-affected stream reaches, to include monitoring fish, foothill yellow-legged frog, and observation of western pond turtle and non-native invasive species in larger stream reaches where new streamflow conditions would likely have the greatest effect on aquatic habitat and water.
- Implement the Aquatic Invasive Species Prevention Guidelines within the proposed Integrated Vegetation Management Plan to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement an Integrated Vegetation Management Plan that combines all measures related to the management of terrestrial vegetation at project facilities and recreation sites and controls the spread of non-native invasive species.
- Monitor animal losses from drowning in project canals.
- Consult with California Fish and Wildlife, the Forest Service, and BLM when replacing wildlife escape and crossing facilities.
- Implement measures to protect the channel morphology and riparian vegetation of Bear River upstream of Forest Service lands, to include modifications to Drum canal winter operations and outage spills and assessment of baseline conditions in Bear Valley meadow.
- Implement a Bald Eagle Management Plan to protect nesting bald eagles from disturbance during project operations and maintenance and project-related recreational activities.

Threatened and Endangered Species

- Implement valley elderberry longhorn beetle conservation measures to avoid or minimize the loss of elderberry shrubs.

Recreation Resources

- Implement a Recreation Facilities Plan for upgrades, maintenance, and development of new project recreation facilities on federal project lands.
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet from May 1 through November 30 for: South Yuba River at Cisco (above Lake Spaulding); Fordyce Creek (below Fordyce Lake); South Yuba River (below Lake Spaulding dam); Bear River (at Highway 20); and Bear River (below Drum afterbay).

Cultural Resources

- Implement an Historic Properties Management Plan (HPMP) to protect resources eligible for inclusion in the National Register of Historic Places.

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan for Primary Project Roads to ensure that project roads are adequately maintained.
- Implement a Fire Prevention and Response Plan on federal project lands to provide fire prevention procedures, reporting, and safe fire practices for PG&E personnel and contractors responsible for operating and maintaining the project.
- Implement a Visual Resource Management Plan on federal land to protect visual and aesthetic resources on and adjacent to project lands.
- Revise the project boundary to remove the Jordan Creek diversion and conveyance system and to include certain primary project roads, and new and rehabilitated recreation facilities after the facilities are decommissioned.

Alternatives Considered

This draft EIS analyzes the effects of continued project operation and recommends conditions for any new license that may be issued for the project. In addition to PG&E's proposal, as outlined above, we consider two alternatives: (1) a staff alternative and (2) no action—continued operation with no changes.

Staff Alternative

Under the staff alternative, the project would be operated and maintained as proposed by PG&E, with the exception of the following revisions or additional measures:

- Implement extreme critically dry water year type flows in the second year of two sequential critically dry years.
- Develop and implement a Large Woody Debris (LWD) Management Plan that would monitor existing conditions and guide development of stream-reach and facility-specific management plans to pass LWD at project dams and diversions for protection and enhancement of downstream aquatic habitat.
- Develop and implement a Bear River Management Plan to assess riparian vegetation and bank stability conditions in the Bear River above the Drum afterbay on Forest Service lands that may be affected by high flow pulses during winter spills from Drum canal. As part of the plan, provide baseline and long-term monitoring of riparian vegetation, erosion and bank stability, and fixed geomorphic baseline channel transects.
- Modify measures to protect channel morphology and riparian vegetation of the Bear River upstream of Forest Service lands to include use of level loggers and monumented cross-sections.
- Provide additional summer flows to the South Yuba River below Lake Spaulding dam (Spaulding No. 1 and No. 2 Development) to manage water temperature for resident aquatic resources by implementing the Supplemental Flow Schedule specified by Forest Service condition 29.
- Establish an Ecological Group to support implementation, review, and management of the South Yuba River supplemental flow releases below Lake Spaulding dam.

- Develop and implement a Jordan Creek diversion decommissioning plan for the proposed removal of water diversion and transport structures that have not been used for project operations for many years.
- Modify the proposed Vegetation Management Plan to extend management to non-federal project lands, and include the protection of culturally significant plant species.
- Obtain prior agency approval and restrict the use of pesticides near special status species on federal project lands.
- Prepare an annual report of animal losses in project canals that includes recommendations address animal mortalities, including implementation schedule and schedule of implementation and distribute to appropriate agencies.
- Construct and modify wildlife seven crossings on Drum and South Yuba canals to minimize wildlife injury and mortality associated with movement across these project canals.
- Develop a wildlife crossing plan for the Bear and South canals to minimize mortality and improve wildlife movement.
- Annually review the Forest Service, BLM, federal, and state special status species lists and assess new species on federal land to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Record annually all incidental observations of bird collision/electrocutions along the Bowman-Spaulding transmission line and replace or retrofit problem power poles as appropriate. Use raptor-safe powerline design for new power lines or when replacing existing structures to reduce raptor injury and mortality.
- Implement bat management measures including installing exclusion devices to minimize disturbance during project operation and maintenance.
- Develop and implement a fish stocking plan for stocking in Lake Spaulding, the Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, to include provisions for stocking fish in additional project reservoirs based on monitoring of recreational use and angling pressure over the term of the new license (replaces PG&E's proposal to pay for fish stocking).
- Modify the Recreation Plan with regard to the implementation schedule, trail development, campground upgrades, accessibility improvements, parking and road improvements, signage, water systems, maintenance, and recreation monitoring and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose.
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet year-round.
- Modify the HPMP to include evaluation of eight cultural resource sites for their National Register eligibility; for those sites determined to be eligible, assess effects and resolve any project-related adverse effects. Implement plan upon license issuance.

- Develop and implement a hazardous substances plan for oil and hazardous substances storage and spill prevention and cleanup.
- Modify the proposed Fire Prevention and Response Plan to include all project lands and to include a period of review and revision.

No-action Alternative

Under the no-action alternative, PG&E would continue to operate the project as it currently does, without making any of its proposed modifications to project facilities, including new recreation facilities. Environmental conditions would remain the same, and no enhancement of environmental resources would occur.

Public Involvement and Areas of Concern

Before filing its license application, PG&E conducted pre-filing consultation under the Integrated Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to application filing.

Before preparing this draft EIS, we conducted scoping to determine what issues and alternatives should be addressed. On March 22, 2008, we distributed a scoping document to interested parties, soliciting comments, recommendations, and information on the project. We held two scoping meetings on June 24, 2008, in Auburn, California, and Grass Valley, California, to request oral comments on the project. On September 25, 2008, we distributed a revised scoping document. On January 19, 2011, we issued notice that the application was ready for environmental analysis and requested conditions and recommendations. On February 29, 2012, we extended the deadline for filing conditions and recommendations until July 31, 2012.

The primary issues associated with relicensing the project are erosion control and restoration measures; flow regimes in project-affected reaches for aquatic resources; spill cessation schedules following high-flow periods to mimic natural conditions and for whitewater boating opportunities; protection of wildlife resources; recreation enhancements; and protection of cultural resources.

Staff Alternative

Geology and Soils

Water spilled from project canals during normal project operation and during canal outages can result in slope and channel destabilization and erosion. The Forest Service and California Fish and Wildlife have identified several stream reaches of the upper Bear River upstream of Drum afterbay (known as Bear Meadow or Bear Valley) where aquatic and riparian habitat may be adversely affected by high flow releases from Drum canal during winter operations and canal outages. In addition, construction and maintenance associated with the extensive network of project recreation facilities can also cause erosion and sedimentation, potentially affecting project lakes, reservoirs, and stream reaches.

Implementation of a project-wide Erosion Control and Slope Maintenance Plan, including a survey to identify steep slopes and areas below project canals that have been affected by spills and canal operations, would minimize the potential for future project operations to cause erosion impacts and prioritize previously affected sites for restoration.

Implementing the proposed and recommended measures for the Bear River Management on federal and non-federal lands would document baseline aquatic and riparian conditions in the upper Bear River area and monitor the effects of high flows from Drum canal on the Bear River channel, bank stability, and riparian vegetation. Review of data generated through this monitoring would guide development of any future mitigation and restoration measures that may be necessary. Interim

management measures and spill flow limits would minimize potential future effects during this ongoing monitoring.

Aquatic Resources

Flow diversions and fluctuations associated with project operation can result in a variety of effects on aquatic resources downstream of project. Project operations and diversions reduce the seasonal and interannual flow variability in natural systems that can influence water temperature and the dynamics and diversity of aquatic ecosystems. The dams at many project lakes and reservoirs are operated to capture and store water from spring snowmelt for water delivery and project operations. Implementing the proposed minimum streamflow schedules would result in higher flows in 18 project-affected stream reaches and minimum streamflows in 12 additional project-affected stream reaches that previously had no minimum streamflow requirement. In project reaches with higher flows, seasonal flow variability more typical of unregulated flow conditions would be introduced with the minimum streamflow schedule. Six water year types ranging from extreme critically dry to wet based on the California Department of Water Resources (DWR) Bulletin 120 estimate of full unimpaired flows for the Yuba River Basin would be used to introduce inter-annual variability to minimum streamflows in larger stream reaches.

Mutual operations of the Drum-Spaulding and Yuba-Bear Projects could affect streamflows in some project-affected reaches. Implementation of a Coordinated Operations Plan would ensure that both PG&E and Nevada Irrigation District (NID) are able to comply with minimum streamflow requirements downstream of their respective project facilities. A specific proposal to coordinate operations at Rollins dam (Yuba-Bear Project) and Bear River canal diversion dam (Drum-Spaulding Project) would ensure compliance with minimum streamflows in Bear River below these two project features. Under typical operations to maximize water storage, when high spring flows begin to decrease and spills at project dams terminate, flows in stream reaches downstream decrease rapidly that can result in stranding of aquatic organisms. Implementing the proposed Spill Cessation and Minimization of Flow Fluctuations measure would provide a gradual reduction of flows over a period of up to 21 days following major spills at Lake Spaulding dam to the South Yuba River that would protect aquatic resources.

Water temperature requirements differ among aquatic resources utilizing project-affected reaches. For example, the colder water temperatures preferred by resident rainbow trout in the South Yuba River below Lake Spaulding dam are not preferred for the reproduction and development of populations of foothill yellow-legged frog (a special-status species). The Supplemental Flow Schedule for water temperature management in the South Yuba River would be implemented at Lake Spaulding dam would protect and enhance cold water habitat for resident rainbow trout and still ensure adequate water temperatures for reproduction and development of foothill yellow-legged frog. Monitoring water temperature and aquatic resources in this stream reach would provide information to evaluate the effectiveness of the Supplemental Flow Schedule releases for protection and enhancement of both of these species.

Water diversions between project developments and projects via canal systems occur throughout the Drum Spaulding and Yuba-Bear Projects; these canals are taken out of service for planned annual and unplanned maintenance and during emergency situations. During an outage when the canal is drained, fish within the canal can be stranded and die. Implementing the proposed measures during canal outages would ensure appropriate notification of resource agencies and passage of natural streamflows at a minimum in affected stream reaches. The Fish Protection and Management During Canal Outages Plan would provide protection to fish in project canals when the canals are drained during an outage and would coordinate these operations with the appropriate resource agencies.

An effective program is required to monitor compliance with these various proposed streamflow measures. Implementation of the Gaging Plan and Flow Setting Plan would demonstrate compliance or non-compliance with the various flow measures proposed in each project-affected stream reach.

LWD can be an important component of aquatic habitat complexity and diversity in some stream reaches; operation of some project dams can reduce or prevent the downstream passage and dispersal of LWD generated in upstream portions of watersheds. LWD can be trapped in some project reservoirs where existing procedures are to remove LWD and stockpile it for subsequent burning or disposal offsite. A survey would identify project impoundments that block the downstream passage of LWD that is currently removed from the system. As necessary, plans would be developed for reintroduction of LWD below these project facilities to enhance aquatic resources in downstream reaches.

The diversion of water by the project between watersheds and extensive and intensive recreational use of project waters have the potential to exacerbate the geographic dispersal and expansion of invasive aquatic species which could degrade aquatic habitat and adversely affect native species. Implementation of proposed measures would minimize the spread of aquatic invasive species resulting from project operation and recreational use of project waters.

Terrestrial Resources

Project operation and maintenance (O&M) activities may have a negative effect on the plant species present within the project boundary. The spread of invasive plant species may be inadvertently encouraged through the disturbance of soil and existing vegetation associated with proposed construction of recreation areas while sensitive and culturally significant plant species may also be negatively affected by construction, clearing, or herbicide application used to control invasive species. Implementing the various plans relative to vegetation (Integrated Vegetation Management Plan, Vegetation Management Plan, and Non-Native Invasive Species Management Plan), as modified to include provisions for non-federal project lands and protection of culturally significant species, would minimize the potential for negative effects associated with project O&M activities.

Wildlife mortality associated with drowning in project canals has been an issue for some of the target species (e.g., mule deer) using habitats within the project boundary. Implementing the proposed and recommended alternative wildlife crossing conditions that provide for monitoring of animal losses in canals and constructing new deer bridges and retrofitting existing bridges would minimize wildlife mortality associated with the attempted crossing of these project features by target wildlife species and improve wildlife movement through the project area.

Project power lines may adversely affect raptors through injury or mortality associated with electrocution and collisions. Monitoring of collisions/electrocutions along the project's Bowman-Spaulding transmission line would assist in the identification of problem transmission line components that would be replaced or retrofitted to reduce or eliminate the risk to raptors.

Recreation

Project lakes and reservoirs, project-affected stream reaches and project lands provide a wide range of recreational opportunities. Recreation facilities and opportunities in some portions of the project receive heavy use that can adversely affect environmental and recreational resources. The proposed Recreation Plan would provide additional hiking opportunities at the project, including the development of new trails at Meadow Lake, Rucker Lake, Blue Lake, and Carr Lake, and additional or improved camping opportunities, including new campgrounds at Lake Valley, Lake Spaulding, Lower Lindsey Creek, Fordyce Lake, Lower Peak Lake; reconstruction of Meadow Lake shoreline campground, Meadow Knolls group campground, Carr Lake walk-in campground, Lower Lindsay Lake campground; and improvements at Lodgepole campground and Rucker Lake walk-in campground. Implementing PG&E's proposed Recreation Plan would provide additional and improved boating opportunities at the project and include the conversion of the existing informal boat launch at Rucker Lake into a formal car-top boat launch, developing an informal boat launch at the Carr Lake walk-in campground, and extending the boat ramp at the Silvertip boat launch at Lake Valley reservoir to make the boat ramp usable at lower reservoir water levels.

In addition to the measures proposed by PG&E, we also recommend that the Recreation Plan include some trail development improvements, campground upgrades, accessibility improvements, parking and road improvements, and signage improvements that were not proposed by PG&E. We also recommend that the Recreation Plan not include provisions for campground hosts or added amenities at campground host sites, nor would it include enhancements to trails, trailheads, or trail facilities that do not serve a project purpose. Implementing the Recreation Plan with recommended modifications would enhance recreational opportunities at the project and ensure operation and adequate maintenance of existing and proposed project recreational facilities.

Angling is one of the primary recreational activities at the project. Stocking is necessary to sustain populations of game fish in project waters with high angler use. Development and implementation of a staff-recommended fish stocking plan would ensure that fish stocking continues at existing stocked reservoirs and lakes to meet current and future ecological and recreational needs. This plan would address stocking in project waters that currently receive heavy angling pressure such as, Lake Spaulding, Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, but would also include provisions for stocking fish in additional project reservoirs in the future, to address changes in recreational use and angling pressure during the term of the new license.

Certain streamflow measures, specifically flow reductions during spill cessation at Lake Spaulding and Fordyce Lake drawdown, would provide more predictable and extended periods of high flow, enhancing existing whitewater boating opportunities at the project. A special event flow proposed by PG&E during the Fordyce Lake drawdown would enhance opportunities for off-highway vehicle crossing of Fordyce Creek.

Cultural Resources

Through implementation of PG&E's final HPMP, as revised based on SHPO and tribal comments, and staff review, project-related adverse effects on historic properties would be avoided, reduced, or mitigated.

Land Use

Uses of and activities on project lands have the potential to affect environmental and natural resources in the project area. Implementing the proposed Transportation Management Plan would ensure that all project roads are maintained to current, applicable standards, would improve access to the project, and would minimize the potential for adverse environmental effects due to road use and road maintenance. The plan would also clarify PG&E's road management responsibilities within the project boundary.

Continued project O&M (e.g., transmission lines, generators, and construction equipment) and increased recreational use over the term of a new license may contribute to fire danger in the project areas through the increased use of formal and dispersed campsites and fire rings. Fires can affect, among other things, public safety, property, aesthetics, and air quality. Implementing the staff recommended Fire Prevention and Response Plan would improve planning, management, and coordination of wildfire protection. Implementation of the plan would also lead to a reduction in the occurrence of wildfires in the project area and the need for suppression by implementing measures for prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations and use, minimizing damage to environmental and natural resources and other potential effects.

The potential exists for the licensee to spill hazardous substances within the project boundary and to impact area resources. Implementation of the staff alternative Hazardous Substances Plan would ensure that spills of hazardous substances are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects, including impacts to water quality.

Aesthetics

Implementation of the proposed Visual Resource Management Plan, which includes identifying those project facilities that would be painted a darker color to reduce visual contrast and establishes a process to evaluate future activities at the project that may result in changes to the visual environment, would reduce color contrast, make project facilities more consistent with established visual quality objectives, and improve overall visual quality in the project area. Consultation, as required under the plan, would ensure that any new facilities or enhancements to existing facilities are designed and constructed to be consistent with applicable visual quality objectives.

No-action Alternative

Under the no-action alternative, PG&E would continue to operate the project as it currently does, without making any of its proposed modifications to project facilities, including new recreation facilities. Environmental conditions would remain the same, and no enhancement of environmental resources would occur.

Conclusions

Based on our analysis, we recommend licensing the project as proposed by PG&E, with some staff modifications and additional measures.

In section 4.1.2 of the draft EIS, we estimate the likely cost of alternative power for each of the three alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative, project power would cost \$61,371,000, or \$84.42 per megawatt-hour (MWh), less than the likely alternative cost of power. Under the proposed action alternative, project power would cost \$68,877,000, or \$105.48/MWh, more than the likely alternative cost of power. Under the staff alternative, project power would cost \$71,459,000, or \$109.43/MWh more than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (653,000 MWh annually); (2) the project could save an equivalent amount of fossil-fueled generation and capacity, which may help conserve non-renewable energy resources and reduce atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by PG&E, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

YUBA-BEAR PROJECT

Proposed Action

On April 15, 2011, NID filed an application for a new major license to operate and maintain the Yuba-Bear Hydroelectric Project (Project No. 2266) that would increase its licensed capacity from 79.32 MW to 90.72 MW. The project includes four developments located on the Middle Yuba River, the South Yuba River, and the Bear River in Sierra, Nevada, and Placer Counties, California. The project occupies 1,749.3 acres of federal land: 1,540.8 acres within the Tahoe National Forest administered by the Forest Service and 208.5 acres administered by BLM.

Project Description

The Yuba-Bear Project's developments include: Bowman (3.6 MW installed capacity), Dutch Flat No. 2 (24.6 MW installed capacity), Chicago Park (39 MW installed capacity), and Rollins (12.2 MW installed capacity). Among these four developments, there are 13 main dams; 11 reservoirs or impoundments; 4 major water conduits; 4 powerhouses with associated switchyards with a combined authorized installed capacity of 79.32 MW; one 9-mile-long, 60-kilovolt transmission line; and

appurtenant facilities and structures, including recreation facilities. Each of the developments is described further in section 2.1.1.2, *Existing Project Facilities, Yuba-Bear Project*, of this draft EIS.

Proposed Facilities

NID proposes to construct a new powerhouse (the Rollins upgrade) that would be located within the existing FERC project boundary on NID-owned land adjacent to the existing Rollins powerhouse. The Rollins upgrade would increase the installed capacity of the project from 79.32 MW to 90.72 MW. NID's proposed project also includes modifications to the existing FERC project boundary to encompass some roads and environmental measures, including proposed minimum flow releases.

NID proposes to build new facilities and rehabilitate existing facilities at the following recreation areas: Jackson Meadows reservoir, Milton diversion impoundment, Bowman Lake, Sawmill Lake, Canyon Creek, Dutch Flat no. 2 forebay, and Dutch Flat afterbay.

Finally, NID proposes to remove a segment of Chicago Park Forebay Road and the unnamed recreation road that provides access to the Jackson Meadows administrative site.

Proposed Operation

NID proposes to modify project operations affecting minimum streamflows, spills from project canals and conduits, and the rate of flow fluctuations following spill events to provide environmental benefits to project affected resources as described below. In conjunction with proposed new minimum streamflows, NID also proposes the following new or upgraded flow monitoring facilities:

- Texas, Clear, Fall, Trap, and Rucker Creek diversion dams at Bowman-Spaulding diversion conduit—install gages YB-317, YB-318, YB-319, YB-320, and YB-321;
- French dam, Faucherie dam, and Sawmill dam—improve flow rating of the USGS gages 11414410, 11414500, and 11414470 in Canyon Creek;
- Dutch Flat afterbay dam—improve flow rating of the USGS gage 11421790 in the Bear River.

Proposed Environmental Measures

NID proposes the following environmental measures.

General Measures

- Consult annually with the Forest Service and BLM to review operations and monitoring data from the prior year and conduct planning for ongoing project operations.
- Conduct annual employee training to familiarize project staff with special-status species, non-native invasive plants, and sensitive areas known to occur within the project boundary on Forest Service or BLM land, and the procedures for reporting to each agency.
- Annually review special status species lists and assess potential impacts to newly listed species on federal project lands.
- Consult with the Forest Service, BLM, or, as appropriate, California Fish and Wildlife, to determine potential project-related effects of any proposed future ground-disturbing activity on federal project land.

- Prepare and submit a biological evaluation examining the potential impacts to special status species or their critical habitats from the construction of new project features on Forest Service or BLM land, and consult with California Fish and Wildlife, as appropriate.
- Implement a Coordinated Operations Plan for the Drum-Spaulding and Yuba-Bear Projects regarding implementation of flow-related measures in each project's license.
- Obtain prior written approval of the Forest Service or BLM, as appropriate, for the use of pesticides or herbicides on or affecting public land.

Geology and Soils

- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during the Rollins upgrade construction.
- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during recreation facility construction.
- Implement a Clear and Trap Creeks Channel Stabilization Plan to stabilize existing erosion effects from spills in two stream channels and one spill channel directly downstream of the Bowman-Spaulding canal.
- Implement an Erosion Control and Slope Maintenance Plan to identify the means to inventory, record, treat, and monitor potentially significant project-related erosion and sedimentation impacts on federal project lands and minimize future erosion and sedimentation.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98.
- To enhance aquatic habitat and support and protect resident aquatic species, provide the same or increased minimum streamflows to six project-affected reaches and provide new minimum streamflows to eight project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Middle Yuba River – below Jackson Meadows dam	3-149
Middle Yuba River – below Milton diversion dam	3-151
Wilson Creek – below Wilson Creek diversion dam	3-155
Jackson Creek – below Jackson dam	3-156
Canyon Creek – below French dam	3-157
Canyon Creek – below Faucherie dam	3-159
Canyon Creek - below Sawmill dam	3-161
Canyon Creek – below Bowman-Spaulding diversion	3-163

Project-Affected Reach	Table No. in Appendix A-2
dam	
Texas Creek – below Texas Creek diversion dam	3-167
Clear Creek – below Bowman-Spaulding diversion conduit	3-168
Trap Creek – below Bowman-Spaulding diversion conduit	3-173
Rucker Creek – below Bowman-Spaulding diversion conduit	3-174
Bear River – below Dutch Flat afterbay dam	3-175
Bear River – below Rollins dam	3-178

- Notify licensing stakeholders at the annual consultation meeting of all annual planned and non-routine planned canal outages in the Bowman-Spaulding diversion conduit. Provide minimum streamflow or inflow, whichever is less during canal outages in Bowman-Spaulding conduit and Drum-Spaulding Project's Drum canal. Consult with licensing stakeholders if the outage is anticipated to extend past 30 days and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage.
- Implement overwintering minimum streamflow adjustments below Milton diversion dam and Bowman-Spaulding diversion dam in response to extended periods of low regional precipitation, as described in section 3.3.2.2.1, *Water Quantity*.
- Measure streamflows at specified locations for documenting compliance with the proposed minimum streamflow requirements listed above and described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, table 3-189.
- Implement the periodic minimum streamflow settings due to remote location and access difficulties at Wilson Creek diversion dam, as described in section 3.3.2.2.1, *Water Quantity*.
- From May 1 through September 15, avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park powerhouse in a synchronous condense mode when the unit is not generating electricity. During non-routine planned outages that would cause Dutch Flat afterbay dam to spill to the downstream Bear River, make a good faith effort to motor the Chicago Park powerhouse until the increased flows from the Dutch Flat afterbay dam reach the tailrace of Chicago Park powerhouse to prevent a sharp decrease in flows in the Bear River downstream of the Chicago Park powerhouse.
- To reduce the risk of stranding of aquatic resources implement spill cessation schedules and minimize flow fluctuations at Milton and Bowman-Spaulding diversion dams and Dutch Flat afterbay dam, as described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, tables 3-184, 3-185, 3-186, and 3-187.

- To prevent rapid flow fluctuations in the lower Bear River below Rollins dam, balance inflow from upstream with outflows when the Rollins reservoir water surface elevation is within the top 2 to 3 feet of the reservoir.
- Implement minimum streamflows for the Fall Creek diversion dam, as described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, table 3-170.
- Implement a Canal Fish Rescue Plan to minimize fish losses when canals are drained for maintenance and repair.
- Monitor numbers of fish entrained into the Milton-Bowman conduit weekly from April 15 through August 15 and provide a report evaluating effects of entrainment to the Forest Service, California Fish and Wildlife, and the California State Water Resources Control Board (California Water Board) for review and approval.
- Annually in October, relocate LWD that has accumulated on the upstream side of Rollins dam spillway log boom to the downstream side of the log boom. Allow the LWD between the log boom and spillway to pass over the spillway when the reservoir spills to enhance aquatic habitat in the Bear River below Rollins dam.
- Implement an Aquatic Monitoring Plan to assess the effects of proposed flow modifications on aquatic resources in selected project-affected stream reaches.
- Implement aquatic invasive species management measures to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement a Non-Native Invasive Plant Management Plan to manage invasive weeds on federal lands within the project boundary through prevention, surveys, management, and reporting.
- Implement a Vegetation Management Plan on federal project lands to restore native vegetation in areas disturbed by project operation and maintenance through revegetation.
- Record annually all incidental observations of bird collisions/electrocutions at the Bowman-Spaulding transmission line. Consult with the Forest Service, U.S. Fish and Wildlife Service, and California Fish and Wildlife concerning measures needed to ensure the protection of birds where incidental observations of bird collisions/electrocutions illustrate a problem pole or transmission structure. Replace or retrofit poles with substantial raptor-project interaction issues.
- Consult with the Forest Service or BLM, as appropriate, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals, and consult with California Fish and Wildlife regarding specifications and design. Assess existing wildlife escape facilities annually to ensure they are functional and in proper working order.
- Record animal losses from drowning in all project canals. Provide this information to California Fish and Wildlife, the Forest Service, or BLM, as appropriate, as well as to the Commission. In consultation with the appropriate resource agencies, develop additional measures to address suspected project-related causes of mortality if there is an increasing trend in wildlife mortalities in a canal.

- Document all known bat roosts within project buildings, dams, or other structures. Provide inspection results to California Fish and Wildlife, the Forest Service, and BLM, as appropriate. If bats or signs of roosting are present where project personnel routinely work, place humane exclusion devices to prevent occupation of the structure by bats.
- Implement a Bald Eagle Management Plan to protect nesting bald eagles from disturbance during project operations and recreational activities.
- Monitor the foothill yellow-legged frog population in Steephollow Creek from the confluence with the Bear River for a distance of 1,000 meters (1,094 yards) upstream, to assess if spills from the Chicago Park conduit result in adverse effects on the foothill yellow-legged frog population in Steephollow Creek and, if necessary, to facilitate the development of mitigation measures.
- Conduct event-based monitoring of the foothill yellow-legged frog populations in Steephollow Creek beginning the second full calendar year after a spill event and repeat in the third year following that spill event, and submit a monitoring report to BLM, California Fish and Wildlife, and the California Water Board.

Recreation Resources

- Implement a Recreation Facilities Plan for upgrades, maintenance, and development of new project recreation facilities on federal project lands.
- Pay California Fish and Wildlife annually for the stocking of up to 20,000 trout fry and 25,000 kokanee fry in Bowman Lake and the stocking of up to 10,000 catchable rainbow trout, 10,000 catchable brown trout, and 25,000 kokanee fry in Rollins reservoir
- Make mean daily streamflow information related to recreation boating opportunities available to the public via the internet from May 1 through November 30 for: Jackson Meadows reservoir; French Lake; Faucherie Lake; Sawmill Lake; Jackson Lake; Bowman Lake; Rollins Lake; Middle Yuba River below Milton diversion dam; Canyon Creek below Bowman dam; and Bear River below Rollins dam.
- Provide supplemental flows (target streamflow of between 120 and 150 cfs over a continuous 24-hour period as measured at gage YB-306) in Canyon Creek below French dam for whitewater boating starting between September 1 and September 30 of each year, until the date that French Lake elevation reaches 6,638 feet msl.
- Provide recreational streamflow events (continuous mean daily target streamflow of 300 cfs for at least 6 continuous days as measured at USGS gage 11408550 [Middle Yuba River below Milton diversion dam]) in any years in which spill at Milton diversion dam is 300 cfs or greater after May 1.
- Provide recreational streamflow events (continuous mean daily target streamflow of 275 cfs for at least 5 continuous days as measured at gage 11416500 [Canyon Creek downstream of the Bowman-Spaulding diversion dam] after April 1) in any years in which flow as measured at USGS gage 11416500 is 275 cfs or greater.

Cultural Resources

- Implement an HPMP to ensure protection of cultural resources and resources that are eligible for inclusion in the National Register of Historic Places.

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan to rehabilitate and maintain primary project roads to ensure that project roads are adequately maintained.
- Implement a Fire Prevention and Response Plan on federal land, to provide fire prevention procedures, reporting, and safe fire practices for NID personnel and contractors responsible for operating and maintaining the project.
- Revise the project boundary to remove the mineral survey area south of the Dutch Flat afterbay and the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it and to include certain primary project roads, and new and rehabilitated recreation facilities.
- Develop and implement a hazardous materials spill prevention, control, and countermeasure plan for the Rollins upgrade construction.
- Develop and implement a recreation facilities construction hazardous materials spill prevention, control, and countermeasure plan.
- Implement a Visual Resource Management Plan on federal lands to improve the visual quality of the project by reducing the visual contrast of existing and proposed project facilities.

Alternatives Considered

This draft EIS analyzes the effects of continued project operation and recommends conditions for a new license that may be issued for the project. In addition to NID's proposals, we consider two alternatives: (1) staff alternative; and (2) no action—continued operation with no changes.

Staff Alternative

Under the staff alternative, the project would include most of NID's proposed measures, as outlined above (excluding preparation of biological assessments), with the exception of the following revisions or additional measures:

- Implement extreme critically dry water year type flows in the second year of two sequential critically dry years.
- Prepare and implement a Fish Entrainment Protection Plan for the Milton-Bowman conduit, including design, installation, and seasonal operation of fish screens to minimize entrainment of juvenile fish into the conduit.
- Prepare and implement a LWD management plan to ensure passage of LWD at project dams and diversions to support downstream aquatic habitat, as necessary, including Middle Yuba River below Jackson Meadows dam, Canyon Creek below Bowman dam, Bear River below Dutch Flat afterbay dam, and Bear River below Rollins dam.

- Implement minimum streamflows below Fall Creek diversion dam to protect and enhance aquatic habitat.
- Modify the Vegetation Management Plan and Non-Native Invasive Plant Management Plan to extend management to non-federal project lands, and include the protection of culturally significant plant species.
- Prepare an annual report of animal losses in project canals that includes recommendations to address animal mortalities including implementation schedule and schedule of implementation and distribute to appropriate agencies.
- Modify foothill yellow-legged frog monitoring population in Steephollow Creek to include further reduction of large magnitude spills and increased monitoring of the frog.
- Provide one new wildlife crossing on Bowman-Spaulding canal and maintain two existing crossings to minimize wildlife injury and mortality associated with movement across this project canal.
- Annually review special status species list and assess new species on federal project lands to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Develop and implement a fish stocking plan that addresses stocking in Rollins reservoir, Jackson Meadows reservoir, Bowman Lake, and Faucherie Lake, but also includes provisions for stocking fish in additional project reservoirs based on changes in recreational use and angling pressure over the term of the new license (replaces NID's proposal to pay for fish stocking).
- Modify the Recreation Plan with regard to the implementation schedule, trail development, campground upgrades, accessibility, parking and road improvements, boat launches, water systems, and monitoring, and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose.
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet year-round.
- Modify the proposed Fire Prevention and Response Plan to include all project lands and to include a period of review and revision.

No-action Alternative

Under the no-action alternative, NID would continue to operate the project as it currently does, without making any of its proposed modifications to project facilities, including new recreation facilities. Environmental conditions would remain the same, and no enhancement of environmental resources would occur.

Public Involvement and Areas of Concern

Before filing its license application, NID conducted pre-filing consultation under the Integrated Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to application filing.

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The primary issues associated with relicensing the project are erosion control and restoration measures; flow regimes in project-affected reaches for aquatic resources; spill cessation schedules following high-flow periods to mimic natural conditions and for whitewater boating opportunities; protection of wildlife resources; recreation enhancements; and protection of cultural resources.

Staff Alternative

Geology and Soils

Water spilled from project canals during normal operation and during canal outages can result in slope and channel destabilization and erosion; this has specifically been a problem below spill gates in the Bowman-SpaULDing conduit in several stream reaches transected by the conduit. In addition, construction and maintenance associated with the proposed Rollins Development upgrade and the extensive network of project recreation facilities also have the potential to result in erosion and sedimentation potentially affecting project lakes, reservoirs, and stream reaches.

Implementing a project-wide Erosion Control and Slope Maintenance Plan, including a survey to identify steep slopes and areas below project canals that have been affected by spills and canal operations, would minimize the potential for future project operations to cause erosion impacts and prioritize previously affected sites for restoration. Specific plans would be implemented for erosion control during the Rollins Development upgrade and for construction activities at existing or proposed recreation facilities. The proposed Clear and Trap Creeks Channel Stabilization Plan specifically addresses the stabilization and repair of areas previously affected by erosion as a result of spills from the Bowman-SpaULDing conduit.

Aquatic Resources

Flow diversion and fluctuations associated with project operation can result in a variety of effects on aquatic resources downstream of the project. Project operation alters the natural hydrograph of project-affected stream reaches reducing the seasonal and interannual flow variability observed in natural systems which can influence water temperature and the dynamics and diversity of aquatic ecosystems. The dams at many project lakes and reservoirs are operated to capture and store water from spring snowmelt for water delivery and project operations. Implementing the proposed minimum streamflow schedules would result in similar or higher flows in six project-affected stream reaches and minimum streamflows in nine additional project-affected stream reaches which previously had no minimum streamflow requirement. In project reaches with higher flows, interannual flow variability would be introduced with the minimum streamflow schedule set dependent on six water year types ranging from extreme critically dry to wet based on the California DWR Bulletin 120 estimate of full unimpaired flows for the Yuba River Basin. Implementation of a proposed Aquatic Monitoring Plan would provide information that would be used to evaluate if implementation of these flow measures is protective of aquatic resources in project-affected reaches, including resident rainbow trout and foothill yellow-legged frog.

Mutual operations of the Drum-SpaULDing and Yuba-Bear Projects could affect streamflows in some project-affected reaches. A Coordinated Operations Plan would ensure that both NID and PG&E

are able to comply with minimum flows where mutual operations could affect streamflows. A specific proposal to coordinate operations at Rollins dam (Yuba-Bear Project) and Bear River canal diversion dam (Drum-Spaulding Project) would ensure that NID is able to comply with minimum streamflows in Bear River below these two project features.

Under typical operations to maximize water storage, when high spring flows begin to decrease and spills at project dams terminate, flows in stream reaches downstream decrease rapidly that can result in stranding of aquatic organisms. The proposed Spill Cessation and Minimization of Flow Fluctuations measure sets a schedule for the gradual reduction of flows over a period of 3 to 21 days (depending on the location and duration of the spill) following major spills at Milton diversion dam to Middle Yuba River, at Bowman dam to Canyon Creek, and at Dutch Flat afterbay to the Bear River for the protection of aquatic resources. Similarly, flow fluctuations in the lower Bear River below Rollins dam would be minimized by balancing inflow with outflow when Rollins reservoir is within 3 feet of full pool.

An effective program is required to monitor compliance with these various proposed streamflow measures. Implementation of the Gaging Plan and Flow Setting Plan would demonstrate compliance or non-compliance with the various flow measures proposed in each project-affected stream reach.

Water diversions between project developments and projects via canal systems occur throughout the Drum-Spaulding and Yuba-Bear Projects; these canals are taken out of service for planned annual and unplanned maintenance and during emergency situations. During an outage when the canal is drained, fish within the canal can be stranded and die. Implementation of proposed measures during canal outages would ensure appropriate notification of resource agencies and passage of natural streamflows at a minimum in affected stream reaches. The Fish Protection and Management During Canal Outages Plan would provide protection to fish in project canals when the canals are drained during an outage and would coordinate these operations with the appropriate resource agencies.

Entrainment of fish (particularly juvenile trout) into project canals could reduce the populations of these species in the stream reach from which the diversion is made. A proposed Mitigation for Fish Entrainment Plan to be implemented at the Milton diversion dam on Middle Yuba River would result in the design, construction, and operation of fish screens to minimize entrainment of juvenile fish into the Milton-Bowman conduit during summer and fall.

LWD is an important component of aquatic habitat complexity and diversity; operation of some project dams can reduce or prevent the natural downstream passage and dispersal of LWD generated in upstream portions of watersheds. LWD can be trapped in some project reservoirs where standard procedure is to remove LWD and stockpile it for subsequent burning or disposal offsite. A survey would identify project impoundments that block the downstream passage of LWD which is removed from the impoundment for burning or offsite disposal. Plans would be developed for reintroduction of LWD below these project facilities to enhance aquatic resources in downstream reaches. Initially, specific LWD management plans would be developed for Rollins reservoir, Jackson Meadows reservoir, and Dutch Flat afterbay to enhance aquatic habitat in the Middle Yuba River and Bear River.

The diversion of water by the project between watersheds and extensive and intensive recreational use of project waters have the potential to exacerbate the geographic dispersal and expansion of invasive aquatic species which could degrade aquatic habitat and adversely affect native species. Measures would be implemented to minimize the risk that project operations would cause or speed the spread of aquatic invasive species. Educational and preventive measures would be established to reduce the likelihood that aquatic invasive species are spread as a result of recreational use of project waters.

Terrestrial Resources

Project O&M activities can have a negative effect on the plant species present within the project boundary. The spread of invasive plant species may be inadvertently encouraged through the disturbance of soil and existing vegetation associated with proposed construction of recreation areas while sensitive

and culturally significant plant species may also be negatively affected by construction, clearing, or herbicide application used to control invasive species. Implementation of the various plans relative to vegetation (Integrated Vegetation Management Plan, Vegetation Management Plan, and Non-Native Invasive Species Management Plan), as modified to include provisions for non-federal project lands and the protection of culturally significant species, would minimize the potential for negative effects associated with project O&M activities.

Wildlife mortality associated with drowning in project canals has been an issue for some of the target species (e.g., mule deer) using the habitats within the project boundary. Implementation of the proposed and recommended alternative wildlife crossing conditions would minimize wildlife mortality associated with the attempted crossing of these project features by target wildlife species.

Project power lines may have a negative effect on raptors using the habitats within the project boundary as a result of injury or mortality associated with electrocution and collisions. Monitoring of collisions/electrocutions along the Bowman-Spaulding transmission line would assist in the identification of problem transmission line components that would be replaced or retrofitted to reduce or eliminate the risk to raptors.

Recreation

Numerous project lakes and reservoirs and project-affected reaches and the large percentage of the project that occurs on National Forest lands provide a wide range of recreational opportunities. Recreation facilities and opportunities in some portions of the project receive heavy public usage that can adversely affect environmental and recreational resources. Implementing the NID's proposed Recreation Plan would provide additional hiking opportunities at the project, including the development of new trails at East Meadow campground, Pass Creek boat launch, Aspen group campground, the Woodcamp complex trail system, Fir Top campground, Faucherie Lake, French Lake, Sawmill Lake, and from Vista Point and Aspen Group campground to a lake overlook, and trail and trailhead improvements for project-related trails in the Jackson Meadows area. The proposed Recreation Plan would provide additional or improved camping opportunities at the project, including new campgrounds in the Jackson Meadows area, at Sawmill Lake, and Canyon Creek; the development of primitive campsites at the Milton Diversion impoundment and along the shoreline at Bowman Lake; and improvements at the Faucherie group campground and at the existing campgrounds at Jackson Meadows reservoir. Implementing NID's proposed Recreation Plan would provide additional and improved boating opportunities at the project and include improvements at the Woodcamp boat launch, extending the Pass Creek boat ramp to make the boat ramp usable at lower reservoir water levels, and developing a new hand launch at Milton Diversion impoundment.

In addition to the measures proposed by NID, we also recommend that the Recreation Plan include some trail development improvements, campground upgrades, accessibility improvements, parking and road improvements, and boat launch improvements that were not proposed by NID. We also recommend that the Recreation Plan not include provisions for campground hosts or added amenities at campground host sites, nor would it include enhancements to trails, trailheads, or trail facilities that do not serve a project purpose. Implementing the Recreation Plan with recommended modifications would enhance recreational opportunities at the project and ensure operation and adequate maintenance of existing and proposed project recreational facilities.

Angling is one of the primary recreational activities at the project. Stocking is necessary to sustain populations of game fish in these waters with high angler usage. Development and implementation of the staff-recommended fish stocking plan would ensure that fish stocking continues at existing stocked reservoirs and lakes to meet current and future ecological and recreational needs. This plan would address stocking in project waters that currently receive heavy angling pressure including

Rollins reservoir, Jackson Meadows reservoir, Bowman Lake, and Faucherie Lake, but also includes provisions for stocking fish in additional project reservoirs in the future, to address changes in recreational use and angling pressure during the term of the new license.

Flow reductions during spill cessation at Milton Diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay dam would provide more predictable and extended periods of high flow, enhancing existing whitewater boating opportunities at the project. NID's proposed supplemental flows for whitewater boating at the Milton diversion dam, French dam, and Bowman-Spaulding diversion dam would also significantly enhance whitewater boating opportunities in three project stream reaches.

Cultural Resources

Through implementation of NID's final HPMP as revised based on SHPO and Tribal comments, and staff review, project-related adverse effects on historic properties would be avoided, reduced, or mitigated

Land Use

Uses of and activities on project lands have the potential to affect environmental and natural resources in the project area. Implementation of the proposed Transportation Management Plan would ensure that all project roads are maintained to current, applicable standards, would improve access to the project, and would minimize the potential for adverse environmental effects due to road use and road maintenance. The plan also clarifies the licensee's road management responsibilities within the project boundary.

Continued project operations and O&M of project facilities (e.g., transmission lines, generators, and construction equipment), and increased recreational use over the term of a new license may contribute to fire danger in the project areas through increased use of formal and dispersed campsites and fire rings. Fires may affect, among other things, public safety, property, aesthetics, and air quality. Implementation of the staff alternative Fire Prevention and Response Plan would improve planning, management, and coordination of wildfire protection and prevention measures. Implementation of the plan would also lead to a reduction in the occurrence of wildfires in the project area and the need for suppression by implementing measures for prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations and use, minimizing damage to environmental and natural resources and other potential effects.

The potential exists for the licensee to spill hazardous substances within the project boundary and to impact area resources. Implementation of the staff alternative Hazardous Substances Plan would ensure that spills of hazardous substances are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects, including impacts to water quality.

Aesthetics

Implementation of the proposed Visual Resource Management Plan, which includes identifying those project facilities that would be painted a darker color to reduce visual contrast and establishes a process to evaluate future activities at the project that may result in changes to the visual environment, would reduce color contrast, make project facilities more consistent with established visual quality objectives, and improve overall visual quality in the project area. Consultation, as required under the plan, would ensure that any new facilities or enhancements to existing facilities are designed and constructed to be consistent with applicable visual quality objectives.

No-action Alternative

Under the no-action alternative, NID would continue to operate the project as it currently does without making any of its proposed modifications to project facilities, including new recreation facilities,

and without constructing the proposed Rollins no. 2 powerhouse. Environmental conditions would remain the same, and no enhancement of environmental resources would occur.

Conclusions

Based on our analysis, we recommend licensing the project as proposed by NID, with some staff modifications and additional measures.

In section 4.2.2 of the draft EIS, we estimate the likely cost of alternative power for each of the three alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative, project power would cost \$8,471,000, or \$31.84 per megawatt-hour (MWh) less than the likely alternative cost of power. Under the proposed action alternative, project power would cost \$12,309,000, or \$52.16/MWh more than the likely alternative cost of power. Under the staff alternative, project power would cost \$13,416,000, or \$58.00/MWh more than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (236,000 MWh annually); (2) the project could save an equivalent amount of fossil-fueled generation and capacity, which may help conserve non-renewable energy resources and reduce atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by NID, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, DC

Drum-Spaulding Hydroelectric Project FERC Project No. 2310-193—California

Yuba-Bear Hydroelectric Project FERC Project No. 2266-102—California

1.0 INTRODUCTION

1.1 APPLICATIONS

On April 12, 2011, Pacific Gas and Electric (PG&E) filed an application to relicense its 191.5-megawatt (MW) Drum-Spaulding Project (Project No. 2310) with the Federal Energy Regulatory Commission (FERC or Commission).¹ The Drum-Spaulding Project is located within three primary river basins, the South Yuba River, Bear River, and North Fork of the North Fork American River, in Nevada and Placer Counties, California (figure 1-1). The project consists of 10 developments: (1) Spaulding No. 3; (2) Spaulding Nos. 1 and 2; (3) Deer Creek; (4) Alta; (5) Drum Nos. 1 and 2; (6) Dutch Flat No. 1; (7) Halsey; (8) Wise; (9) Wise No. 2; and (10) Newcastle. These 10 developments include 29 reservoirs, 6 major water conduits, 12 powerhouses, and appurtenant facilities and structures. The project generates an annual average of approximately 794 gigawatt-hours (GWh). The existing project boundary encompasses 5,520.2 acres of land. The majority of the land, 3,443.9 acres, is owned by PG&E. There are 994.0 acres of federal land, 978.3 acres of which are managed by the U.S. Department of Agriculture, Forest Service (Forest Service), 5.1 acres of which are managed by the U.S. Department of the Interior (Interior), Bureau of Reclamation (Reclamation), and 10.6 acres of which are managed by the Interior, Bureau of Land Management (BLM). The remaining land within the project boundary is owned by the state (20.4 acres) and private landowners (1,061.9 acres).

PG&E does not propose any changes to the existing project facilities with the exception of the permanent retirement of Alta powerhouse unit 2, which has not been operating since 2007. Retirement of Alta powerhouse unit 2 would decrease the installed capacity of the project from 192.5 MW to 191.5 MW. PG&E also proposes to split the current Drum-Spaulding Project into two new licensed projects: the Deer Creek Project and the remaining Drum-Spaulding Project without the Deer Creek Project facilities. We consider PG&E's proposal to separate the Deer Creek Project to be administrative or legal in nature and not an environmental measure. Therefore, while we evaluate the environmental effects of

¹ PG&E filed a license application amendment on June 18, 2012, which includes revisions to Exhibits A (Project Description), D (Project Costs and Financing), E (Environmental Report), and G (Project Maps). This amendment included a proposal to separate the original proposed Drum-Spaulding Project into a proposed Drum-Spaulding Project and a proposed Deer Creek Project. This amendment also included all proposed environmental measures that are analyzed in this environmental impact statement. PG&E also filed a license application amendment on August 30, 2012, which included implementation plans and updates to proposed environmental measures, streamflow modeling, economic analyses, environmental information, and Exhibit E.

the Deer Creek facilities, we do not evaluate PG&E's proposed administrative license change in this draft environmental impact statement (EIS).

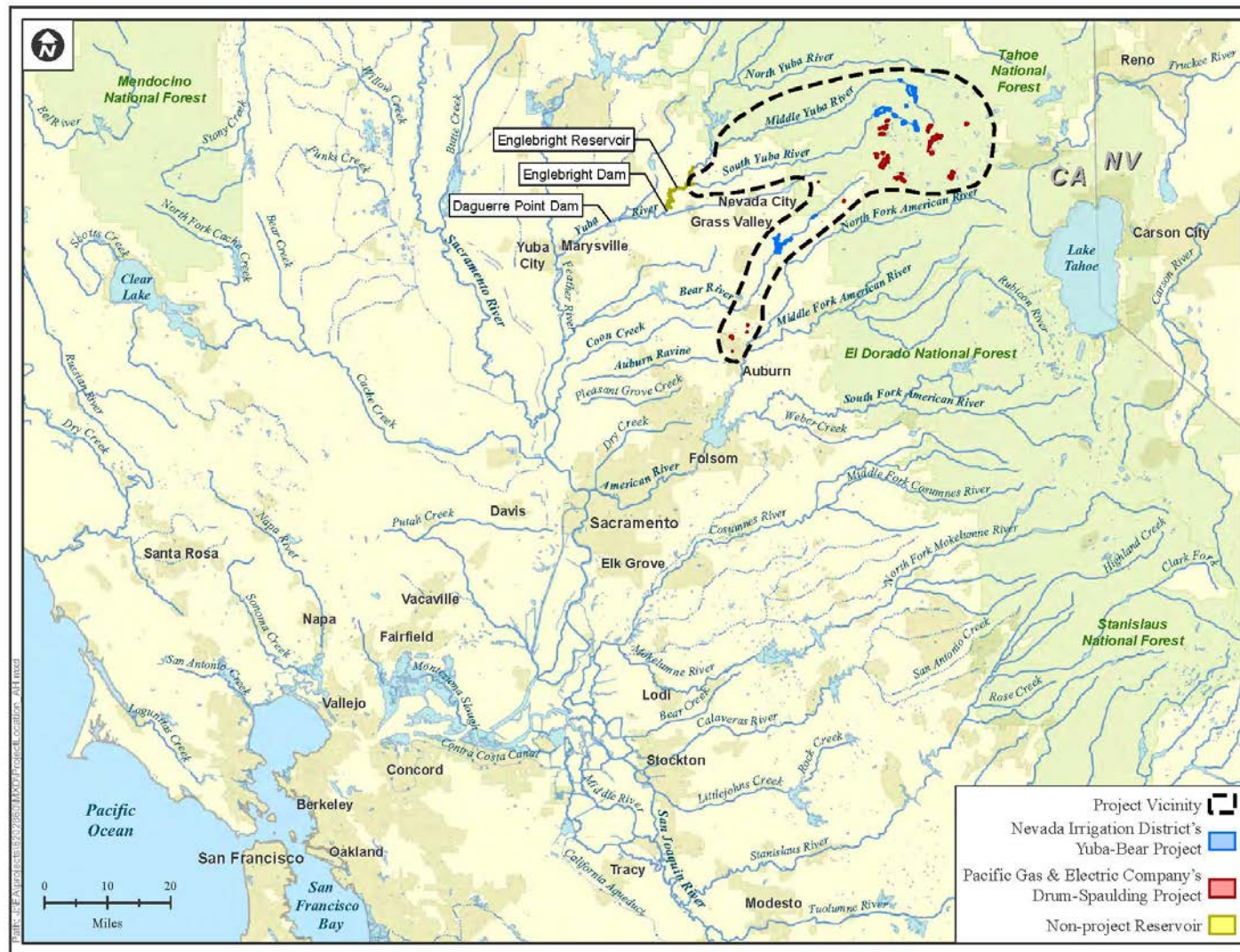
On April 15, 2011, the Nevada Irrigation District (NID) filed an application to relicense its 79.32-MW Yuba-Bear Project (Project No. 2266) with FERC.² The Yuba-Bear Project is located within three major river basins, the Middle Yuba River, South Yuba River, and Bear River, in Sierra, Nevada, and Placer Counties, California (figure 1-1). The project consists of four developments: (1) Bowman; (2) Dutch Flat; (3) Chicago Park; and (4) Rollins. These four developments include the following: 13 main dams, 4 water conduits, and 4 powerhouses and switchyards; one 9-mile-long, 60-kilovolt transmission line; 17 campgrounds and associated boat launches, trails, and recreation facilities; and other appurtenant facilities and structures. The project generates an average of approximately 354 GWh of energy annually. The existing project boundary encompasses 6,252.6 acres of land. The majority of the land, 4,056.3 acres, is owned by NID. There are 1,749.3 acres of federal land, 1,540.8 acres of which are managed by the Forest Service and 208.5 acres of which are managed by BLM. The remaining land within the project boundary is owned by private landowners (447.0 acres).

NID proposes to construct one new powerhouse (the Rollins upgrade) that would be located within the existing project boundary on NID-owned land adjacent to the existing Rollins powerhouse. The Rollins upgrade would increase the installed capacity of the project from 79.32 MW to 90.72 MW. NID's proposed project also includes modifications to the existing project boundary to include all primary project access roads and several recreation sites and to remove two non-project areas. The area within the proposed project would be 170.4 acres less than the area within the existing FERC boundary, including a decrease of 82.7 acres of federal land.

Because: (1) the projects are hydraulically and operationally interrelated and generally have the same physical features located in common watersheds; and (2) the two projects have the same license expiration date (April 30, 2013), we prepared a multi-project EIS.³

² NID filed a license application amendment on June 18, 2012, which includes revisions to Exhibits A (Project Description) and E (Environmental Report). This amendment included all proposed environmental measures that are analyzed in this environmental impact statement. NID also filed a license application amendment on August 17, 2012, which included updates to streamflow modeling, economic analyses, environmental information, and Exhibit E. NID also filed implementation plans on August 30, 2012.

³ The Commission indicated its intention to prepare a multi-project EIS for the projects in Scoping Document 1, issued on May 22, 2008.



1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purposes of the Drum-Spaulding and Yuba-Bear Projects are to provide a source of hydroelectric power and serve as a water supply for both domestic and irrigation purposes. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to PG&E for the Drum-Spaulding Project and to NID for the Yuba-Bear Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the projects would be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing new licenses for the Drum-Spaulding and Yuba-Bear Projects would allow PG&E and NID to continue to generate electricity at the projects for the terms of the new licenses, making electric power from a renewable resource available to their customers.

This draft EIS assesses the effects associated with operation of the proposed projects, examines alternatives to the proposed projects, and makes recommendations to the Commission on whether to issue new licenses, and if so, recommends terms and conditions to become a part of any licenses issued.

In this draft EIS, we assess the environmental and economic effects of continuing to operate the projects: (1) as proposed by PG&E and NID; and (2) with our recommended measures. We also consider the effects of the no-action alternative. Important issues that are addressed include establishing erosion control and restoration measures; establishing flow regimes in project-affected reaches for aquatic resources; establishing spill cessation schedules following high-flow periods to mimic natural conditions and for whitewater boating opportunities; measures for wildlife resources; implementing recreation plans at both projects; and cultural resources.

1.2.2 Need for Power

The Drum-Spaulding and Yuba-Bear Projects would continue to provide hydroelectric generation to meet part of California's power requirements, resource diversity, and capacity needs. The Drum-Spaulding Project has an installed capacity of 191.5 MW and generates about 727 GWh per year. The Yuba-Bear Project has an installed capacity of 79.3 MW and generates about 266 GWh per year.

The projects are located in the California-Mexico Power Area of the Western Electricity Coordinating Council (WECC). California's principal energy agencies (the California Energy Commission, California Public Utility Commission, and California Independent System Operator) continue to produce biennial integrated energy policy reports pursuant to California Senate Bill 1389 (September 2002). The current report, the *2011 Integrated Energy Policy Report*, contains the state's assessment of major energy trends and issues, and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety. The California Energy Commission projects that future electricity consumption in the state will increase at an average of 1.18 to 1.68 percent per year from 2010 through 2022, and peak demand will grow at an average of 1.20 to 1.72 percent annually (California Energy Commission, 2011). Based on projected growth, the California Energy Commission projects that peak demand in the California-Mexico Power Area is expected to reach between 69,700 and 74,200 MW

over the next 10 years, which will require the development of an additional 8,900 to 13,800 MW of new capacity (California Energy Commission, 2011).

We conclude that power from the Drum-Spaulding and Yuba-Bear Projects would continue to meet a need for power and maintain the necessary reserve margins in the WECC region in both the short and long term. The projects provide low-cost power that may displace generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit. Any new generation installed at the projects would help in meeting future energy and capacity needs.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

The licenses for the Drum-Spaulding and Yuba-Bear Projects are subject to numerous requirements under the FPA and other applicable statutes. Major regulatory and statutory requirements are summarized in table 1-1 and described below.

Table 1-1. Major statutory and regulatory requirements for the Drum-Spaulding and Yuba-Bear Projects. (Source: staff)

Requirement	Agency	Status
Section 18 of the FPA (Fishway Prescriptions)	Interior, U.S. Fish and Wildlife Service (FWS); U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS)	FWS and NMFS reserved their authority to prescribe fishways for both projects on July 31, 2012.
Section 4(e) of the FPA (land management conditions)	Forest Service; Reclamation; BLM	The Forest Service provided conditions for the Drum-Spaulding Project and for the Yuba-Bear Project on July 31, 2012. The Forest Service provided revised conditions for both projects on August 23, 2012. Reclamation provided conditions for the Drum-Spaulding Project on July 31, 2012. BLM provided conditions for both projects on July 31, 2012, and revised conditions for both projects on August 27, 2012.
Section 10(j) of the FPA	NMFS; California Department of Fish and Wildlife (California Fish and Wildlife) ^a	On July 31, 2012, NMFS provided recommendations for both projects. California Fish and Wildlife provided recommendations for both projects on July 30, 2012.
Clean Water Act—water quality certification	California State Water Resources Control Board (California Water Board)	The California Water Board received applications for water quality certification from PG&E on February 28, 2012, and February 6, 2013, and from NID on March 15, 2012, and March 1, 2013.

Table 1-1. Major statutory and regulatory requirements for the Drum-Spaulding and Yuba-Bear Projects. (Source: staff)

Requirement	Agency	Status
Endangered Species Act (ESA) consultation	FWS for most species and NMFS for marine and anadromous species	We will seek concurrence from FWS and NMFS with our conclusions regarding federally listed species in this EIS.
Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)	NMFS	The Drum-Spaulding and Yuba-Bear Projects would not affect essential fish habitat (EFH). Coordination with NMFS is not required.
Coastal Zone Management Act (CZMA) Consistency	California Coastal Commission	Relicensing the projects would not influence resources in the designated coastal zone.
National Historic Preservation Act (NHPA) consultation	California State Historic Preservation Officer (SHPO); Tribal Historic Preservation Officers (THPOs)	NID and PG&E have prepared Historic Properties Management Plans (HPMPs) for their respective projects. We will prepare programmatic agreements for both projects.
Wild and Scenic Rivers Act	Forest Service, BLM	The projects would not diminish the outstandingly remarkable values of the designated and eligible river.

^a Effective January 1, 2013, the California Department of Fish and Game was officially changed to the California Department of Fish and Wildlife.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Interior. By letters filed July 31, 2012, Interior and NMFS request that a reservation of authority to prescribe fishways under section 18 be included in any licenses issued for the Drum-Spaulding and Yuba-Bear Projects.

1.3.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Forest Service filed conditions for each project on July 31, 2012, and revised conditions for each project on August 23, 2012. Reclamation filed conditions for the Drum-Spaulding Project on July 31, 2012. BLM filed conditions for each project on July 31, 2012, and revised conditions for each project on August 27, 2012. These conditions are described under section 2.2.4, *Modifications to the Applicant's Proposal—Mandatory Conditions*.

1.3.1.3 Alternative Conditions under the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct) provides parties to these licensing proceedings the opportunity to propose alternatives to 4(e) conditions. On September 14, 2012, PG&E filed alternatives to BLM's conditions, Reclamation's conditions, and the Forest Service's conditions for the Drum-Spaulding Project. On September 14, 2012, NID filed alternatives to BLM's conditions and the Forest Service's conditions for the Yuba-Bear Project. We analyze the alternative conditions within the corresponding resource areas in section 3, *Environmental Analysis*, and sections 5.1.2 and 5.2.2, *Comprehensive Development and Recommended Alternative*, for the Drum-Spaulding Project and Yuba-Bear Project, respectively.

1.3.1.4 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by a project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

California Fish and Wildlife and NMFS timely filed, on July 30, 2012, and July 31, 2012, respectively, recommendations under section 10(j), as summarized for the Drum-Spaulding Project in table 5-2 and for the Yuba-Bear Project in table 5-5, in sections 5.1.4.1 and 5.2.4.1, *Fish and Wildlife Agency Recommendations*, respectively. FWS did not file any recommendations under section 10(j). In sections 5.1.4 and 5.2.4, we also discuss how we address the agency recommendations and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act, a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the Clean Water Act. By letter dated February 27, 2012, PG&E submitted its application for water quality certification to the California Water Board for the Drum-Spaulding Project. By letter dated March 28, 2012, the California Water Board documented receipt of the application on February 28, 2012. Subsequently, PG&E withdrew and refiled its application, which was received by the California Water Board on February 6, 2013. The California Water Board acknowledged the withdrawal and refiling of application on March 7, 2013. The water quality certification for the Drum-Spaulding Project is due by February 6, 2014.

By letter dated March 15, 2012, NID submitted its application for water quality certification to the California Water Board for the Yuba-Bear Project. By letter dated March 29, 2012, the California Water Board documented receipt of the application on March 15, 2012. Subsequently, NID withdrew and refiled its application, which was received by the California Water Board on March 1, 2013. The California Water Board has not yet acted on this request. The water quality certification for the Yuba-Bear Project is due by March 1, 2014.

1.3.3 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Although no federally listed species are

known to occur in the projects' vicinities, five federally listed species have the potential to occur in one or both projects: Stebbins' morning glory (*Calystegia stebbinsii*) (Drum-Spaulding Project and Yuba-Bear Project), Layne's butterweed (*Senecio layneae*) (Drum-Spaulding Project), California red-legged frog (*Rana draytonii*) (Drum-Spaulding Project and Yuba-Bear Project), valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) (Drum-Spaulding Project), and the Central Valley steelhead distinct population segment (DPS) (*Oncorhynchus mykiss irideus*) (Drum-Spaulding Project). One candidate species potentially present in the projects' areas, the North American DPS of wolverine, (*Gulo gulo luscus*), is proposed for listing as a threatened species. Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in sections 5.1.2 and 5.2.2, *Comprehensive Development and Recommended Alternative*, for the Drum-Spaulding Project and the Yuba-Bear Project, respectively.

We conclude that relicensing of the Drum-Spaulding Project, as proposed with staff-recommended measures, is likely to adversely affect the VELB but not likely to adversely affect Stebbins' morning glory, Layne's butterweed, California red-legged frog, or Central Valley steelhead DPS. Given that the activities anticipated under a new license for the project that could potentially affect the VELB are already covered under FWS' June 2003 biological opinion (BO) covering PG&E's operation and maintenance activities and the VELB conservation measures recommended in this draft EIS are consistent with the terms and conditions to minimize incidental take included in the BO, we do not believe that formal consultation is necessary. We also conclude that relicensing of the Yuba-Bear Project, as proposed with staff-recommended measures, is not likely to adversely affect Stebbins' morning glory or California red-legged frog. We will request concurrence from FWS and NMFS with our conclusions. We also conclude that relicensing of Drum-Spaulding Project and Yuba-Bear Project would not jeopardize the continued existence of the wolverine.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the CZMA, 16 United States Code (U.S.C.) § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The projects are not located within the state-designated Coastal Management Zone, which extends from a few blocks to 5 miles inland from the sea (www.coastal.ca.gov), and the projects would not affect California's coastal resources. Therefore, the projects are not subject to California coastal zone program review and no consistency certification is needed for the action. We will provide a copy of this draft EIS to the California Coastal Commission for review.

1.3.5 National Historic Preservation Act

Section 106 of the NHPA requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, we intend to execute Programmatic Agreements (PAs) that would have PG&E and NID implement revised HPMPs based upon our recommendations made in this draft EIS. We intend to issue draft PAs concurrent with this draft EIS that would direct PG&E and NID to revise their HPMPs accordingly. We would then issue final PAs for signatures with the revised HPMPs concurrent with issuance of the final EIS.

1.3.6 Wild and Scenic Rivers Act

Section 7(a) of the Wild and Scenic Rivers Act requires federal agencies to make a determination as to whether the operation of a project under a new license would invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the designated river corridor. The projects do not include any river segments protected under the federal Wild and Scenic Rivers Act, but facilities of the Drum-Spaulding Project lie upstream of a reach of the North Fork American River that was designated under Public Law 95-11 (November 10, 1978) as a Wild and Scenic River because of its outstanding scenery, remote recreation, and historic gold mining values. The 38.3-mile-long designated reach, which runs from a point 0.3 mile above Heath Springs downstream to a point 1,000 feet upstream of the Colfax-Iowa Hill Bridge, is managed by the Forest Service and BLM. The Drum-Spaulding Project's Lake Valley canal diversion dam is located at river mile (RM) 13.4 on the North Fork of the North Fork American River. Additional PG&E facilities in the Drum-Spaulding Project that lie within this subwatershed are the Lake Valley reservoir and dam, Kelly Lake, the Towle diversion, and Towle canal diversion dam. An April 11, 1963, agreement between PG&E, the Forest Service, and California Fish and Wildlife that expires April 30, 2013 requires 1 cubic foot per second (cfs) in the North Fork of the North Fork American River below Lake Valley reservoir dam and 1 cfs below Lake Valley canal diversion dam. The current minimum flow, though, is 3 cfs per a water rights permit-related agreement in the mid-1980s with California Fish and Wildlife. PG&E proposes to increase the minimum streamflow requirement in the North Fork of the North Fork American River below Lake Valley reservoir dam from 1 cfs to 3 cfs during the months of June through September. Neither the Forest Service nor BLM filed any conditions or recommendations specific to this Wild and Scenic River.

The South Yuba River from Spaulding dam to Englebright reservoir has been designated as an Eligible and Suitable Federal Wild and Scenic River, as well as a State Wild and Scenic River under the California Wild and Scenic Rivers Act (Forest Service and BLM, 1999). This 41.1-mile-long segment has high quality scenic, historic, and recreational values. These "outstandingly remarkable" values were defined after the development of the project. The projects would have no effect on historic values, but would have a beneficial effect on scenic and recreational values due to proposed enhanced flow to the South Yuba River.

We conclude that none of the action alternatives would diminish the outstandingly remarkable values of the designated and eligible river segments.

1.3.7 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act requires federal agencies to consult with NMFS on all actions that may adversely affect EFH. EFH has been designated for Pacific salmon within the affected basins of the Yuba-Bear and Drum-Spaulding Projects (50 Code of Federal Regulations [CFR] 660.4391 and 660.392). The designation does not identify specific salmon species or races (e.g., spring-run or fall-run). However, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley fall- and late-fall-run Chinook salmon are species that occur in the Central Valley and are managed under the Pacific Coast Salmon Fisheries Management Plan. The area of the Yuba-Bear and Drum-Spaulding Projects' cumulative effects in the South Yuba River includes designated EFH for salmon. The U.S. Army Corps of Engineer's Englebright dam prevents passage of anadromous fish into the project areas.

PG&E and NID provided an analysis of the projects' effects on Central Valley spring-run Chinook salmon and steelhead and their designated EFH. The applicants examined the effects of out-of-basin water diversions on seasonal flow and on water temperature and determined that summertime regulated conditions are essentially the same as unimpaired conditions and do not affect flow or temperature upstream or downstream of Englebright reservoir and therefore do not affect anadromous fish

species or EFH. After reviewing the information provided by the applicants and NMFS, we concur that the project does not affect Pacific salmon EFH upstream of Englebright reservoir. As such, no consultation is required with NMFS.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR sections 5.1-5.16) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the ESA, the NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this draft EIS, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on May 22, 2008. It was noticed in the Federal Register on June 2, 2008. Two scoping meetings, both advertised in local newspapers, were held on June 24, 2008, in Auburn, California, and Grass Valley, California, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. We also conducted an environmental site review of the project areas on June 17 through 19, 2008, which was attended by several of the individuals who also later attended the scoping meetings. A second site review was conducted on July 6 through 8, 2012. In addition to comments provided at the scoping meetings, the following entities provided written comments:

Commenting entities	Date filed
Foothills Water Network	August 10, 2008
Forest Service, BLM, NMFS, National Park Service, California Fish and Wildlife, and California Water Board	August 11, 2008
Colfax Todd's-Valley Consolidated Tribe	August 11, 2008
Tyrone E. Gorre	August 11, 2008
NMFS, Southwest Region	August 11, 2008
Sackheim Consulting	August 11, 2008
California Water Board	August 11, 2008
Gail and David Mackenroth	August 11, 2008
Placer County Water Agency (PCWA)	August 11, 2008
Social Alliance Network	August 11, 2008
PG&E	August 11, 2008

A revised scoping document (SD2), addressing these comments, was issued on September 25, 2008.

1.4.2 Interventions

On January 19, 2012, the Commission issued notices that PG&E had filed an application to relicense the Drum-Spaulding Project and that NID had filed an application to relicense the Yuba-Bear Project. These notices set April 30, 2012, as the deadline for filing protests and notions to intervene. On February 28 and 29, 2012, the Commission extended the deadline for the filing of interventions until July 31, 2012. In response to these notices, the following entities filed motions to intervene for both projects, unless otherwise indicated, in these proceedings:

Intervenors	Date filed
California Water Board	May 3, 2012
Tyrone Gorre ^a	July 1, 2012
PG&E (Yuba-Bear Project)	July 24, 2012
NID (Drum-Spaulding Project)	July 27, 2012
Interior	July 30, 2012
Forest Service	July 30, 2012
PCWA	July 30, 2012
Yuba County Water Agency (YCWA)	July 30, 2012
California Fish and Wildlife	July 30, 2012
Interior	July 31, 2012
Sackheim Consulting	July 31, 2012
American River Watershed Institute, California Fly Fishers Unlimited, David Wright, Foothill Angler Coalition, John Gardiner, Gold Country Fly Fishers, Grace Hubley Foundation, Granite Bay Flycasters, North Fork American River Alliance, Placer Sierra Railroad Heritage Society, Spring Creek Guide Service, William Carnazzo, and Otis Wollan	July 31, 2012
Foothills Water Network, American Rivers, American Whitewater, California Sportfishing Protection Alliance, Friends of the River, Gold Country Fly Fishers, Northern California Council Federation of Fly Fishers, Ophir Property Owners Association, Save Auburn Ravine Salmon and Steelhead, Sierra Club, South Yuba River Citizens League, and Trout Unlimited	July 31, 2012
Placer County	July 31, 2012
NMFS	July 31, 2012
Tyrone Gorre ^a	July 31, 2012

^a Intervention in opposition.

1.4.3 Comments on the Applications

A notice requesting conditions and recommendations was issued on January 19, 2012. On February 28 and 29, 2012, the Commission extended the deadline for the filing conditions and recommendations until July 31, 2012.⁴ The following entities commented:

Commenting agencies and other entities	Date filed
Elyce Klein	March 12, 2012
Tyrone Gorre	June 5, 2012
United Auburn Indian Community	July 13, 2012
PG&E	July 27, 2012
NID	July 27, 2012
Forest Service	July 30, 2012
PCWA	July 30, 2012
YCWA	July 30, 2012
California Fish and Wildlife	July 30, 2012
Interior	July 31, 2012
Forest Service	July 31, 2012
Foothills Water Network	July 31, 2012
PCWA	July 31, 2012
NMFS	July 31, 2012
Placer County	July 31, 2012
California Fish and Wildlife	July 31, 2012
California Water Board	July 31, 2012
Forest Service	August 2, 2012
NMFS	August 23, 2012
Forest Service	August 23, 2012
Forest Service	August 27, 2012
BLM	August 27, 2012
PG&E	August 30, 2012
NID	August 30, 2012
Foothills Water Network	August 31, 2012
Foothills Water Network	September 12, 2012

⁴ Several comments were received after the filing deadline, but are still considered in this EIS. Several of these comments were filed after the applicants submitted supplemental application information on August 30, 2012 (PG&E), and on August 17 and 30, 2012 (NID).

Commenting agencies and other entities	Date filed
PCWA	September 14, 2012
California Fish and Wildlife	September 14, 2012
Forest Service	September 25, 2012

PG&E and NID filed reply comments on September 14, 2012.

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2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

We use the no-action alternative to establish baseline environmental conditions for comparison with the proposed action and other action alternatives. Under the no-action alternative, the Drum-Spaulding and Yuba-Bear Projects would continue to operate under the terms and conditions of the existing licenses, and no new environmental protection, mitigation, or enhancement measures would be implemented.

2.1.1 Existing Project Facilities

The Drum-Spaulding Project's facilities and the Yuba-Bear Project's facilities are intermingled among the drainage basins of the Middle Yuba River, South Yuba River, Bear River, North Fork of the North Fork American River drainage basins, as shown in figure 2-1. A schematic of the projects' facilities depicting the functional relationship between the two projects and among the developments is provided in figure 2-2.¹ The projects involve the transfer of water between basins for water supply and power generation. Section 2.1.1.1 provides a description of the Drum-Spaulding Project's power, storage, conveyance, and recreational facilities, and section 2.1.1.2 provides a similar description for the Yuba-Bear Project's facilities.

2.1.1.1 Drum-Spaulding Project

PG&E's Drum-Spaulding Project is located in the South Yuba River, Bear River, and North Fork of the North Fork American River drainage basins. All project facilities in the Yuba River Basin are located in the headwaters of the South Yuba River and are upstream of the U.S. Army Corps of Engineers' Englebright Lake and dam (a non-project facility). The project consists of 10 developments: Spaulding No. 3, Spaulding No. 1 and No. 2, Deer Creek, Alta, Drum No. 1 and No. 2, Dutch Flat No. 1, Halsey, Wise, Wise No. 2, and Newcastle. Among these 10 developments, there are 29 reservoirs; 6 major water conduits; 12 powerhouses with associated switchyards with a combined installed capacity of 192.5 MW; 6 transmission lines; 1 distribution line; and appurtenant facilities and structures, including recreation facilities. PG&E not only operates the Drum-Spaulding Project for power generation but, in some cases, to meet the downstream consumptive water demands of both NID and PCWA. Each of the developments is described below.

Spaulding No. 3 Development

The Spaulding No. 3 Development is composed of the following reservoirs and associated dams and spillways: Upper Rock Lake, Lower Rock Lake, Culbertson Lake, Upper Lindsey Lake, Middle Lindsey Lake, Lower Lindsey Lake, Feeley Lake, Carr Lake, Blue Lake, Rucker Lake, and Fuller Lake. The development also includes Spaulding no. 3 powerhouse penstock, Spaulding no. 3 powerhouse and switchyard, and the Spaulding no. 3–Spaulding no. 1 transmission line.

¹ Figure 2-2 is a combined schematic of the Drum-Spaulding and Yuba-Bear Projects. For a more detailed schematic of the Yuba-Bear Project, see figure 5.1.1-1 in Exhibit E (NID, 2011a).

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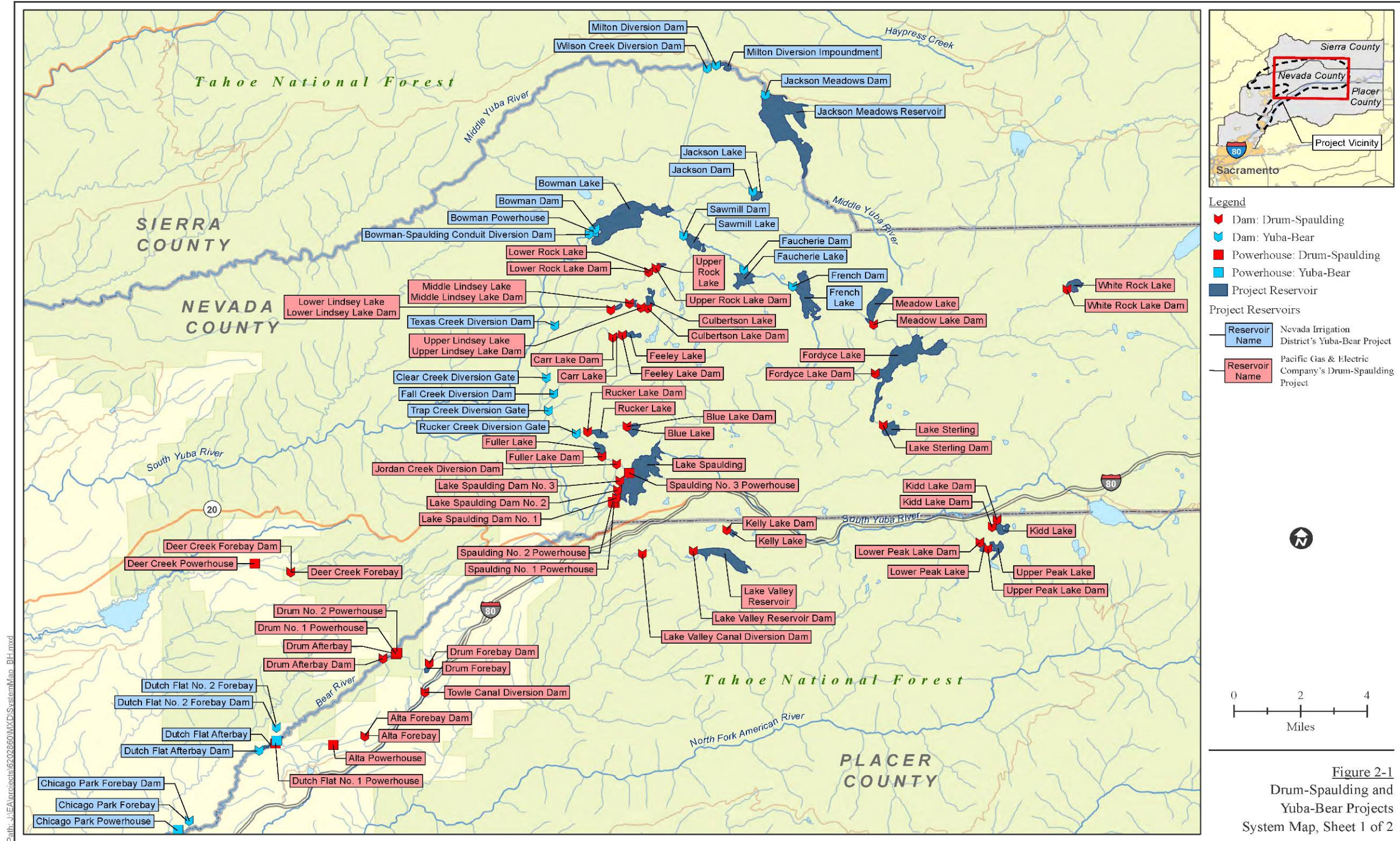


Figure 2-1. Drum-Spaulding and Yuba-Bear Projects system map. (Source: ESRI and Tele Atlas North America, Inc., 2006a and 2006b; ESRI and Bureau of Transportation Statistics, 2006; PG&E, 2011a; and NID, 2011a)

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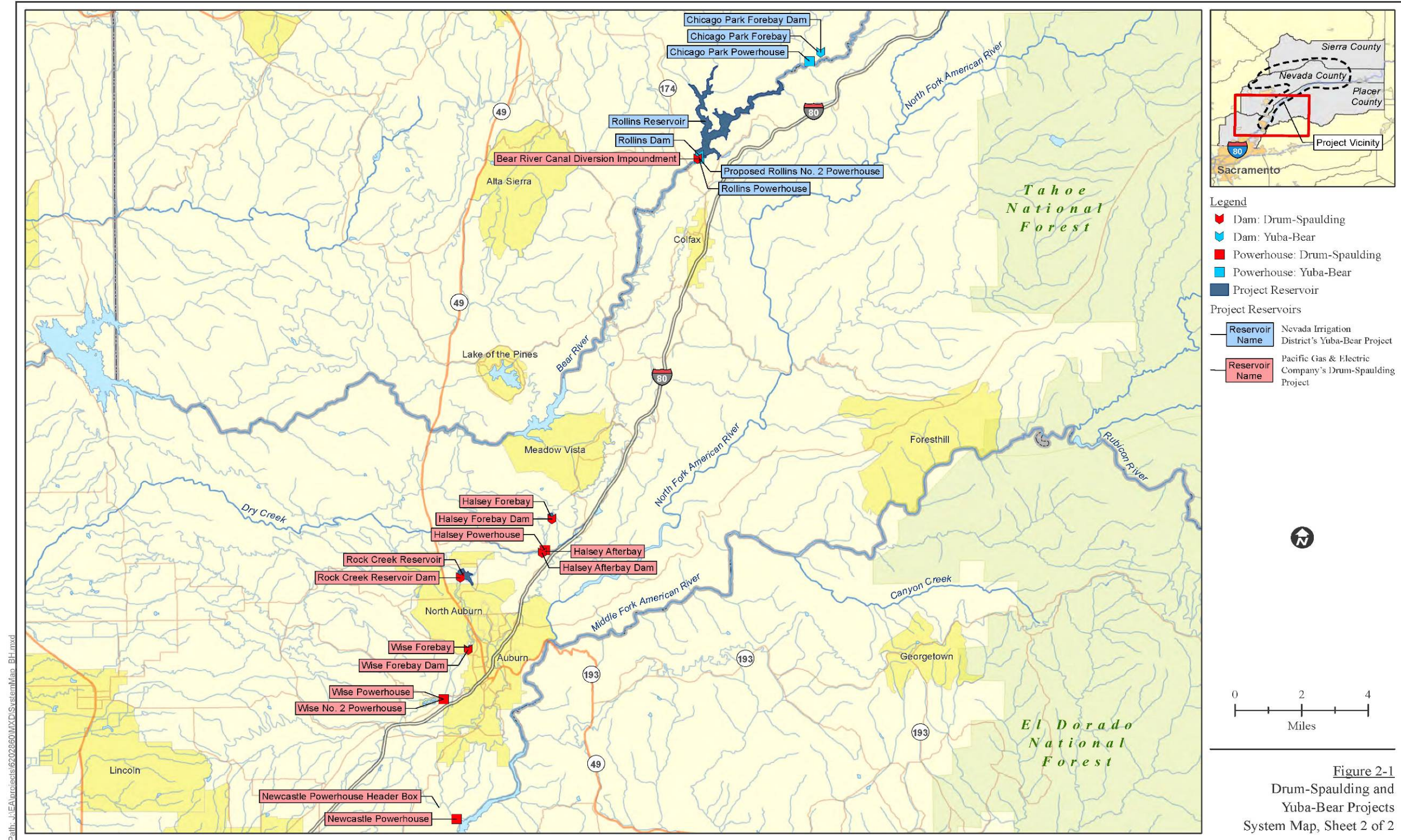


Figure 2-1 (continued). Drum-Spaulding and Yuba-Bear Projects system map. (Source: ESRI and Tele Atlas North America, Inc., 2006a and 2006b; ESRI and Bureau of Transportation Statistics, 2006; PG&E, 2011a; and NID, 2011a)

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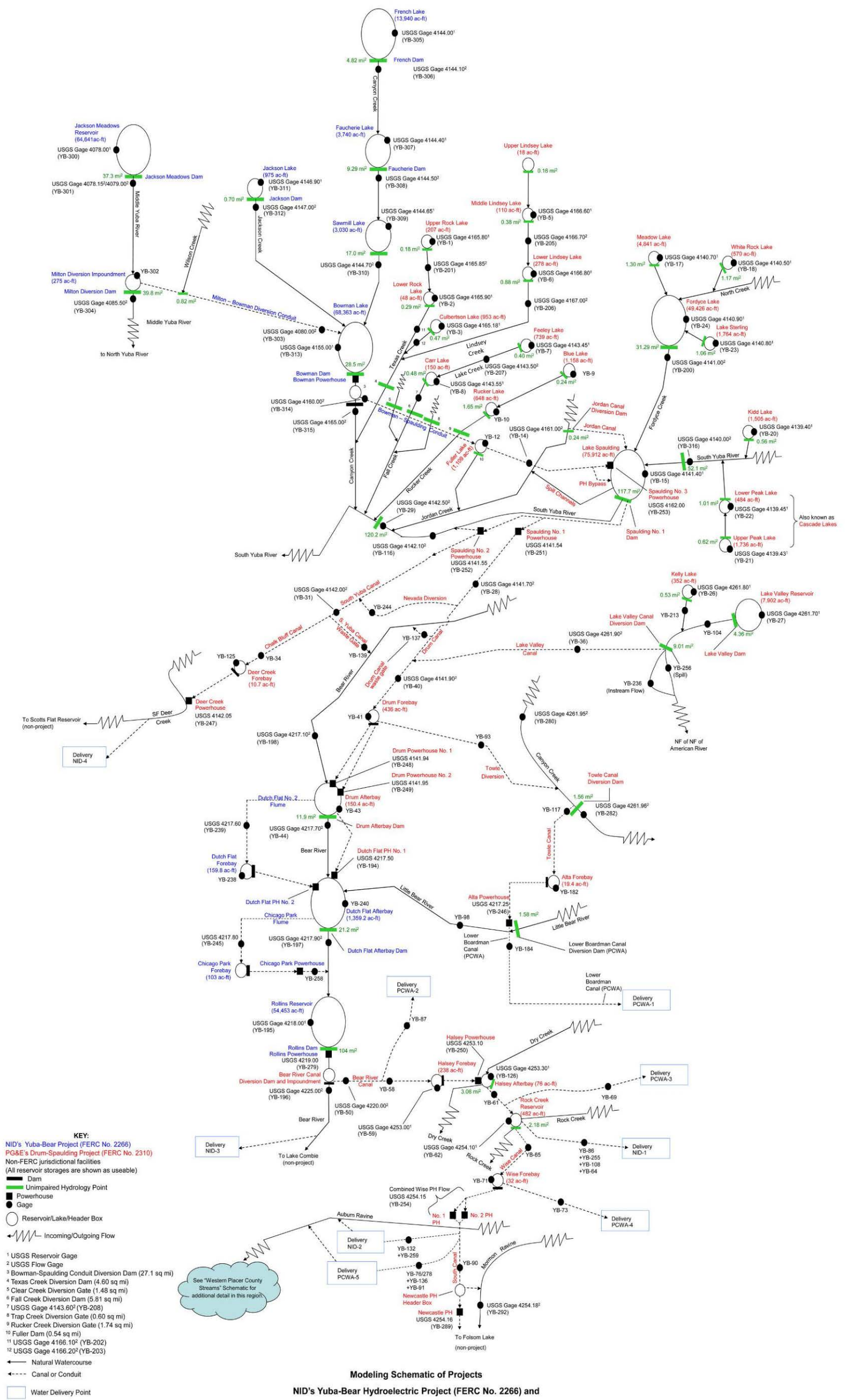


Figure 2-2. Schematic of the Drum-Spaulling and Yuba-Bear Projects. (Source: PG&E and NID, 2012)

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Upper Rock Lake dam is a 16.8-foot-high, 214-foot-long earth-fill dam that impounds Texas Creek to form Upper Rock Lake. The dam has a crest elevation of 6,717.1 feet above mean sea level (msl). Upper Rock Lake has a gross storage capacity of 275 acre-feet and a surface area of 19.8 acres. Normal maximum water surface elevation within the reservoir is 6,714.5 feet msl. The dam has a 17-foot-long uncontrolled overflow spillway. The dam is also equipped with an 18-inch by 24-inch rock truck tunnel that serves as the low-level outlet. The low-level outlet has a maximum capacity of 8.4 cfs. Releases from Upper Rock Lake dam flow into Lower Rock Lake via Texas Creek.

Lower Rock Lake dam is a 10.5-foot-high, 110-foot-long earth- and rock-fill dam that impounds Texas Creek to form Lower Rock Lake. The dam has a crest elevation of 6,627.8 feet msl. Lower Rock Lake has a usable storage capacity of 48 acre-feet and a surface area of 7.6 acres. Normal maximum water surface elevation within the reservoir is 6,625.8 feet msl. The dam has a 30-foot-long uncontrolled overflow spillway. An 8-inch-diameter pipe serves as the low-level outlet for the dam and has a maximum flow capacity of 7.3 cfs. Releases from Lower Rock Lake dam flow into Texas Creek.

Culbertson Lake dam is a 20-foot-high, 255-foot-long earth- and rock-fill dam that impounds an unnamed tributary of Texas Creek to form Culbertson Lake. The dam has a crest elevation of 6,440.2 feet msl. Culbertson Lake has a usable storage capacity of 953 acre-feet and a surface area of 70.5 acres. Normal maximum water surface elevation within the reservoir is 6,436.4 feet msl. The dam has a 23-foot-long overflow spillway. A 12- to 24-inch-diameter pipe serves as the low-level outlet and has a flow capacity of 23.1 cfs. Releases from Culbertson Lake dam flow into Texas Creek downstream of the discharges from Lower Rock Lake via an unnamed tributary.

Upper Lindsey Lake dam is an 8-foot-high, 90-foot-long earth-fill dam that impounds Lindsey Creek to form Upper Lindsey Lake. The dam has a crest elevation of 6,485.4 feet msl. Upper Lindsey Lake has a usable storage capacity of 18 acre-feet and a surface area of 3.9 acres. Normal maximum water surface elevation within the reservoir is 6,482.6 feet msl. The dam has a 5-foot-long overflow spillway. An 8-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 6.5 cfs. Releases from Upper Lindsey Lake dam flow into Middle Lindsey Lake via Lindsey Creek.

Middle Lindsey Lake dam is a 9.5-foot-high, 335-foot-long earth-fill dam that impounds Lindsey Creek to form Middle Lindsey Lake. The dam has a crest elevation of 6,438.2 feet msl. Middle Lindsey Lake has a usable storage capacity of 110 acre-feet and a surface area of 21.5 acres. Normal maximum water surface elevation within the reservoir is 6,435.7 feet msl. The dam has a 37-foot-long overflow spillway. A 10-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 11.3 cfs. Releases from Middle Lindsey dam flow into Lower Lindsey Lake via Lindsey Creek.

Lower Lindsey Lake dam is a 16.6-foot-high, 335-foot-long earth- and rock-fill dam that impounds Lindsey Creek to form Lower Lindsey Lake. The dam has a crest elevation of 6,239.1 feet msl. Lower Lindsey Lake has a usable storage capacity of 278 acre-feet and a surface area of 29.4 acres. Normal maximum water surface elevation within the reservoir is 6,235.6 feet msl. The dam has a 42-foot-long overflow spillway. A 14-inch-diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 28.1 cfs. Releases from Lower Lindsey dam flow into Texas Creek downstream of the discharges from Lower Rock dam and Culbertson Lake dam.

Flows from the facilities described above are diverted from Texas Creek to NID's Bowman-Spaulding conduit by Texas Creek diversion dam (Yuba-Bear Project, Dutch Flat Development). Undiverted flows continue downstream to Canyon Creek and eventually the South Yuba River at RM 32.4.

Feeley Lake dam is a 22.6-foot-high, 210-foot-long earth- and rock-fill dam that impounds Lake Creek to form Feeley Lake. The dam has a crest elevation of 6,727.6 feet msl. Feeley Lake has a usable

storage capacity of 739 acre-feet and a surface area of 52 acres. Normal maximum water surface elevation within the reservoir is 6,723.6 feet msl. The dam has a 32-foot-long overflow spillway. A 10- to 24-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 16.8 cfs. Releases from Feely Lake dam flow into Carr Lake via Lake Creek.

Carr Lake dam is an 8-foot-high, 185-foot-long earth- and rock-fill dam that impounds Lake Creek to form Carr Lake. The dam has a crest elevation of 6,667.7 feet msl. Carr Lake has a usable storage capacity of 150 acre-feet and a surface area of 15.8 acres. Normal maximum water surface elevation within the reservoir is 6,663.7 feet msl. The dam has a 40-foot-long overflow spillway. A 24-inch-diameter concrete-encased pipe serves as the low-level outlet and has a maximum flow capacity of 82.7 cfs. Releases from Carr Lake dam continue down Lake Creek into Fall Creek and are diverted into NID's Bowman-Spaulding conduit by the Fall Creek diversion dam (Yuba-Bear Project, Dutch Flat Development). Undiverted flows continue downstream via Fall Creek, which also receives flows from Clear and Trap Creeks not diverted into NID's Bowman-Spaulding conduit by Clear and Trap Creek diversion gates (Yuba-Bear Project, Dutch Flat Development), before entering the South Yuba River at RM 35.6.

Blue Lake dam is a 25-foot-high, 296-foot-long earth- and rock-fill dam that impounds Rucker Creek to form Blue Lake. The dam has a crest elevation of 5,935.6 feet msl. Blue Lake has a usable storage capacity of 1,158 acre-feet and a surface area of 59.7 acres. Normal maximum water surface elevation within the reservoir is 5,931.6 feet msl. The dam has a 12-foot-long overflow spillway. An 18-inch-diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 18 cfs. Releases from Blue Lake dam flow into Rucker Lake via Rucker Creek.

Rucker Lake dam is a 22-foot-high, 620-foot-long earth- and rock-fill dam that impounds Rucker Creek to form Rucker Lake. The dam has a crest elevation of 5,468.2 feet msl. Rucker Lake has a usable storage capacity of 648 acre-feet and a surface area of 78.6 acres. Normal maximum water surface elevation within the reservoir is 5,464.2 feet msl. The dam has a 60-foot-long overflow spillway. A 15- to 24-inch-diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 15 cfs. Releases from Rucker Lake dam continue downstream via Rucker Creek and are diverted into NID's Bowman-Spaulding conduit by the Rucker Creek diversion gate (Yuba-Bear Project, Dutch Flat Development) before entering the South Yuba River at RM 37.0.

Fuller Lake dam is a 39-foot-high, 410-foot-long earth- and rock-fill dam that impounds an unnamed tributary of Jordan Creek to form Fuller Lake. The dam has a crest elevation of 5,343.5 feet msl. Fuller Lake receives water diverted by NID's Bowman-Spaulding conduit (Yuba-Bear Project, Dutch Flat Development) and is used as a re-regulating pool to control the rate at which water enters Spaulding no. 3 powerhouse for hydropower generation shaping. The reservoir has a usable storage capacity of 1,109 acre-feet and a surface area of 70.2 acres. Normal maximum water surface elevation within the reservoir is 5,341.8 feet msl. The dam has 15-foot-long siphonic spillway and a 15-foot-long auxiliary spillway. A 14- to 24-inch outside diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 25 cfs. Releases from Fuller Lake dam flow from an unnamed tributary into Jordan Creek, which enters the South Yuba River at RM 40.2.

The 1,614.5-foot-long, 66-inch-diameter Spaulding no. 3 powerhouse steel penstock releases water from NID's Bowman-Spaulding conduit to the Spaulding no. 3 powerhouse. The penstock has a maximum flow capacity of 334 cfs. Spaulding no. 3 powerhouse is located on the northwest side of Lake Spaulding. PG&E operates this powerhouse semi-automatically in a base-loaded fashion, generating based on flows that are scheduled for consumptive water and power demands. Spaulding no. 3 powerhouse has an installed capacity of 5.8 MW with a synchronous generator, four Francis turbines with

a rated nameplate hydraulic capacity of 270 cfs, and a dependable capacity of 4.3 MW.² The Spaulding no. 3–Spaulding no. 1 transmission line is a 60-kilovolt (kV), 1.1-mile-long line that connects Spaulding no. 3 powerhouse to Spaulding no. 1 powerhouse switchyard. The Spaulding no. 3 powerhouse discharges into Lake Spaulding.

Recreational facilities in Spaulding No. 3 Development include: Upper Rock Lake primitive campsites (3 sites); Lower Rock Lake primitive campsites (3 sites); Culbertson Lake primitive campsites (3 sites); Middle Lindsey Lake primitive campsites (3 sites); Lower Lindsey Lake campground (12 sites); Lower Lindsey Lake trailhead (20 parking spaces); Carr Lake walk-in campground (11 sites); Carr-Feeley trailhead (30 parking spaces); Rucker Lake walk-in campground (7 sites); Fuller Lake day use and boat launch (8 picnic sites, 14 parking spaces, and a 1-lane concrete ramp); Fuller Lake angler access (6 parking spaces); Blue Lake primitive campsites (10 sites); Bear Valley group campground (1 site); and Sierra discovery trail (1 mile interpretive trail and 4 picnic sites).

Spaulding No. 1 and No. 2 Development

The Spaulding No. 1 and No. 2 Development is composed of the following reservoirs and associated dams and spillways: White Rock Lake, Meadow Lake, Lake Sterling, Fordyce Lake, Kidd Lake, Upper Peak Lake, Lower Peak Lake, and Lake Spaulding. PG&E operates these reservoirs to fill with spring and summer runoff that accumulates during the snowmelt season, to provide water for consumptive downstream demand, hydroelectric generation, environmental water releases, and recreational benefits. The Spaulding No. 1 and No. 2 Development also contains Spaulding no. 1 powerhouse and tunnel, Spaulding no. 2 powerhouse and penstock, Spaulding no. 1 and no. 2 powerhouse switchyard, Spaulding no. 2–Spaulding no. 1 transmission line, and the South Yuba canal.

White Rock Lake dam is a 10-foot-high, 331-foot-long earth-fill and rock-wall dam that impounds White Rock Creek to form White Rock Lake. The dam has a crest elevation of 7,824.0 feet msl. White Rock Lake has a usable storage capacity of 570 acre-feet and a surface area of 88.9 acres. Normal maximum water surface elevation within the reservoir is 7,820.0 feet msl. The dam has a 40-foot-long overflow spillway. A 12-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 18.6 cfs. Releases from White Rock dam flow down White Rock Creek into North Creek and enter Fordyce Lake.

Meadow Lake dam is a 38-foot-high, 940-foot-long earth-fill and rock wall dam that impounds an unnamed tributary to form the Meadow Lake reservoir. The dam has a crest elevation of 7,286.2 feet. Meadow Lake has a usable storage capacity of 4,841 acre-feet and a surface area of 240 acres. Normal maximum water surface elevation within the reservoir is 7,281.8 feet msl. The dam has a 65-foot-long overflow spillway. A 26-inch-diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 50 cfs. Releases from Meadow Lake dam flow into Fordyce Lake via an unnamed tributary.

Lake Sterling dam is a 25-foot-high, 228-foot-long rock-fill dam that impounds Bloody Creek to form Lake Sterling. The dam has a crest elevation of 6,988.7 feet msl. Lake Sterling has a usable storage capacity of 1,764 acre-feet and a surface area of 104.7 acres. Normal maximum water surface elevation within the reservoir is 6,987.9 feet msl. The dam has an overflow spillway controlled with flashboards during the summer months. A 20-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 31.9 cfs. Releases from Lake Sterling dam flow into Fordyce Lake via Bloody Creek.

² Dependable capacities are based on average daily power generation data as estimated in the applicants' No-Action Alternative Operations Model run over the period of July-August 1977, which represents a period of adverse (i.e., low) water conditions coupled with high demand for electricity.

Fordyce Lake dam is a 156-foot-high, 1,220-foot-long rock-fill dam that impounds Fordyce Creek to form Fordyce Lake. The dam has a crest elevation of 6,406.6 feet msl. Fordyce Lake has a usable storage capacity of 49,426 acre-feet and a surface area of 716.2 acres. Normal maximum water surface elevation within the reservoir is 6,405.1 feet msl. The dam has a 120-foot-long lateral overflow spillway controlled with two 15-foot-by-14-foot radial gates and flashboards during the summer months. A 47-inch steel pipe serves as the low-level outlet and has a maximum flow capacity of 590 cfs. Releases from Fordyce Lake dam flow into Lake Spaulding via Fordyce Creek.

Kidd Lake dam is a 35-foot-high, 449-foot-long earth- and rock-fill dam that impounds an unnamed tributary to form Kidd Lake. The dam has a crest elevation of 6,631.4 feet msl. Kidd Lake has a usable storage capacity of 1,505 acre-feet and a surface area of 86.7 acres. Normal maximum water surface elevation within the reservoir is 6,627.6 feet msl. The dam has a 37-foot-long uncontrolled overflow spillway. A 20- to 24-inch-diameter steel pipe serves as the low-level outlet and has a maximum flow capacity of 25 cfs. Releases from Kidd Lake dam flow down an unnamed tributary into the South Yuba River at RM 0.0 and enter Lake Spaulding.

Upper Peak Lake dam is a 39-foot-high, 316-foot-long earth- and rock-fill dam that impounds Cascade Creek to form Upper Peak Lake. The dam has a crest elevation of 6,611.4 feet msl. Upper Peak Lake has a usable storage capacity of 1,736 acre-feet and a surface area of 83.8 acres. Normal maximum water surface elevation within the reservoir is 6,607.4 feet msl. The dam has a 30-foot-long overflow spillway. A 20-inch-diameter steel conduit serves as the low-level outlet and has a maximum discharge of 100 cfs. Releases from Upper Peak Lake dam flow into Lower Peak Lake via Cascade Creek.

Lower Peak Lake dam is a 29-foot-high, 200-foot-long earth- and rock-fill dam that impounds Cascade Creek to form Lower Peak Lake. The dam has a crest elevation of 6,583.4 feet msl. Lower Peak Lake has a usable storage capacity of 484 acre-feet and a surface area of 33 acres. Normal maximum water surface elevation within the reservoir is 6,581.9 feet msl. The dam has a 55-foot-long overflow spillway. A 21-inch-diameter steel pipe serves as the low-level outlet and has a maximum discharge of 86.7 cfs. Releases from Lower Peak Lake dam flow down Cascade Creek into the South Yuba River at RM 0.0 and enter Lake Spaulding.

Three dams were required to block all drainages and create Lake Spaulding: Lake Spaulding dams no. 1, 2, and 3. Lake Spaulding dam no. 1 (main dam) is a 276-foot-high, 800-foot-long concrete-arch dam that impounds the South Yuba River to form Lake Spaulding. The dam has a crest elevation of 5,016.1 feet msl. A 30-inch-diameter pipe serves as the low-level outlet and has a maximum flow capacity of 16 cfs. Lake Spaulding dam no. 2 is a 42-foot-high, 309-foot-long concrete-gravity dam located on an unnamed tributary to Jordan Creek. The dam has a crest elevation of 5,016.1 feet. The dam has a 271.3-foot-long overflow spillway with elevations ranging from 4,994.6 to 5,014.6 feet msl. The spillway is controlled by three 14-foot-by-20-foot radial gates, seven 14-foot-by-15-foot radial gates, and 14 flashboards. Lake Spaulding dam no. 3 is a 91-foot-high, 813-foot-long concrete gravity arch dam on a topographic low point that would otherwise drain to Jordan Creek. The dam has a crest elevation of 5,019.6 feet. The dam has a 21-foot-long overflow spillway controlled by 10 bays with emergency trippable flashboards. Lake Spaulding has a usable storage area of 75,912-acre-feet and a surface area of 682 acres. Normal maximum water surface elevation within the reservoir is 5,014.6 feet. Releases from Lake Spaulding dam no. 1 flow into the Spaulding no. 1 powerhouse tunnel and Spaulding no. 2 penstock, and releases from Lake Spaulding dam no. 2 flow into a spill channel discharging to an unnamed tributary to Jordan Creek. Releases into the spill channel flow into Jordan Creek and then into the South Yuba River at RM 0.0.

Spaulding no. 1 powerhouse tunnel is a 963-foot-long, 104-inch-diameter rock tunnel that diverts up to 600 cfs of water from Lake Spaulding to Spaulding no.1 powerhouse. Spaulding no. 1 powerhouse

is located downstream of Lake Spaulding and discharges, along with the Spaulding no. 1 powerhouse bypass, up to 840 cfs into Drum canal (part of the Drum No. 1 and No. 2 Development). This powerhouse features semi-automatic operation and is scheduled as base-loaded for downstream water demand. Spaulding no. 1 powerhouse has an installed capacity of 7.0 MW with a synchronous generator and one Francis turbine with a nameplate hydraulic capacity of 600 cfs.

Spaulding no. 2 penstock diverts up to 200 cfs of water from Lake Spaulding to the Spaulding no. 2 powerhouse. Spaulding no. 2 powerhouse is located downstream of Lake Spaulding, adjacent to Spaulding no. 1 powerhouse. This powerhouse features semi-automatic operation and PG&E schedules it as base-loaded for downstream water demand. Spaulding no. 2 powerhouse has an installed capacity of 4.4 MW with a synchronous generator and one Francis turbine with a rated nameplate hydraulic capacity of 200 cfs. Spaulding no. 2 powerhouse discharges into the South Yuba canal. The Spaulding No. 1 and No. 2 Development has a combined dependable capacity of 5.5 MW. The Spaulding no. 2–Spaulding no. 1 transmission line is a 2.3-kV single-circuit, 0.04-mile-long line that connects Spaulding no. 2 powerhouse to Spaulding no. 1 powerhouse transformer.

Recreational facilities in Spaulding No. 1 and No. 2 Development include: White Rock Lake primitive campsites (6 sites); Meadow Lake campground (15 sites); Meadow Lake shoreline campsites (10 sites); Meadow Knoll group campground (2 sites); Lake Sterling walk-in campground (6 sites); Kidd Lake group campground (3 sites); Lake Spaulding campground (25 sites); Lake Spaulding overflow campground (10 sites); and Lake Spaulding boat launch (67 parking spaces, 2-lane concrete ramp, and 3 picnic sites).

Deer Creek Development

The Deer Creek Development consists of the South Yuba canal, Chalk Bluff canal, Deer Creek forebay, Deer Creek powerhouse penstock, Deer Creek powerhouse, and the Deer Creek–Drum transmission line.

South Yuba canal diverts up to 126 cfs from Spaulding no. 2 powerhouse to its confluence with Chalk Bluff canal, where the South Yuba canal terminates. South Yuba canal is composed of open ditch (5 feet deep by 7 feet wide), flume (6.5 feet wide by 7 feet high), and pipe sections (156-inch-diameter) and has total length of 14.0 miles. Spills from the South Yuba canal enter the Bear River via the South Yuba canal waste gate.

Chalk Bluff canal has a capacity of 107 cfs and diverts water from its confluence with the South Yuba canal to Deer Creek forebay. The canal is composed of open ditch (5 feet deep by 6 feet wide), Lennon flume (156-inch), and pipe sections (52-inch-diameter) and has total length of 3.2 miles.

Deer Creek forebay dam is a 14-foot-high, 1,175-foot-long earth-fill dam located at the downstream end of the Chalk Bluff canal. The dam has a crest elevation of 4,470.0 feet msl. Deer Creek forebay has a usable storage capacity of 10.7 acre-feet and a surface area of 3.3 acres. Normal maximum water surface elevation in the reservoir is 4,473.0 feet. PG&E operates the Deer Creek forebay as a re-regulating reservoir, regulating flow into Deer Creek powerhouse. The dam has a 400-foot-long overflow spillway controlled by manually hoisted flashboards. A 10-inch drain valve serves as the low-level outlet and has a maximum capacity of 80 cfs. Releases from Deer Creek forebay dam flow into the Deer Creek powerhouse via the Deer Creek penstock.

The Deer Creek steel penstock is 42 to 48 inches in diameter, 5,589 feet long, has a capacity of 110 cfs. Deer Creek powerhouse is located 1.05 miles from Deer Creek forebay. Deer Creek powerhouse is a semiautomatic plant. PG&E operates this powerhouse as a diversion plant generating for daily downstream water demands of NID. The powerhouse has an installed capacity of 5.7 MW with a

synchronous generator, one double overhung impulse turbine with a rated nameplate hydraulic capacity of 110 cfs, and a dependable capacity of 4.7 MW. The Deer Creek powerhouse discharges into the South Fork of Deer Creek, which leads to the Scotts Flat reservoir (non-project facility). The Deer Creek-Drum transmission line is a 60-kV single-circuit line that extends 6.25 miles from Deer Creek powerhouse to Drum powerhouse switchyard.

The Deer Creek forebay angler access (5 parking spaces) is the only recreational facility in Deer Creek Development.

Alta Development

The Alta Development consists of Towle diversion, Towle canal diversion dam, Towle canal, Alta forebay and dam, and Alta powerhouse and switchyard. Towle canal diversion dam is a 5.5-foot-high wooden diversion dam with steel vertical slide gates. Towle canal diverts water (up to 42 cfs) from Canyon Creek (primarily consisting of deliveries from Drum forebay into Canyon Creek upstream via Towle diversion) to Alta forebay. Towle canal consists of open ditch (6.5 feet wide by 4.5 feet deep) and flume (96-inch and 108-inch Lennon flume) sections and has a total length of 3.9 miles.

Alta forebay dam is a 13-foot-high, 1,500-foot-long earth-fill dam. The dam has a crest elevation of 4,243.0 feet msl. Alta forebay has a usable storage capacity of 19.4 acre-feet and a surface area of 5 acres. Normal maximum water surface elevation within the reservoir is 4,240.0 feet. Alta forebay dam has an 8.5-foot-long overflow spillway. PG&E operates Alta forebay as a re-regulating reservoir, regulating flow into Alta powerhouse.

Alta powerhouse is located below Alta forebay, northeast of Alta, California. PG&E operates this powerhouse semi-automatically based on PCWA's downstream water demands. Alta powerhouse has an installed capacity of 2.0 MW with a synchronous generator, two overhung impulse turbines with a combined rated nameplate hydraulic capacity of 56 cfs, and a dependable capacity of 0.8 MW. The water that discharges from Alta powerhouse enters into the Alta powerhouse tailrace area where most of it is immediately re-diverted into PCWA's Lower Boardman canal for downstream consumptive water demands. Undiverted flows are released to Dutch Flat afterbay via the Little Bear River.

Drum No. 1 and No. 2 Development

The Drum No. 1 and No. 2 Development consists of Lake Valley reservoir, dam, and spillway; Kelly Lake reservoir, dam, and spillway; Lake Valley canal diversion dam; Lake Valley canal, Drum canal; Drum forebay dam and reservoir; Drum no. 1 powerhouse penstocks no. 1 and no. 2; Drum powerhouse tunnels; Drum no. 2 powerhouse penstock no. 3; Drum no. 1 powerhouse; and Drum no. 2 powerhouse.

Lake Valley reservoir dam is a 75-foot-high, 1,035-foot-long earth- and rock-fill dam that impounds the North Fork of the North Fork American River to form Lake Valley reservoir. The dam has a crest elevation of 5,789.9 feet msl. The reservoir has a usable storage capacity of 7.902 acre-feet and a surface area of 303.9 acres. Normal maximum water surface elevation within the reservoir is 5,784.9 feet msl. The dam has a 525-foot-long overflow spillway controlled with manually hoisted flashboards from April to September. A 30-inch pipe serves as the low-level outlet and has a maximum flow capacity of 50 cfs. Releases from Lake Valley dam flow into the North Fork of the North Fork American River.

Kelly Lake dam is a 10.5- to 23.5-foot-high, 448-foot-long earth and rock-fill dam that impounds Sixmile Creek to form Kelly Lake. The dam has a crest elevation of 5,911.3 feet msl. The reservoir has a usable storage capacity of 352 acre-feet and a surface area of 28 acres. Normal maximum water surface elevation within the reservoir is 5,908.8 feet msl. The dam has an 18-foot-long overflow spillway

controlled with manually hoisted flashboards and a maximum discharge of 490 cfs. A 20-inch-diameter pipe with a flow capacity of 25 cfs serves as the low-level outlet. Releases from Kelly Lake dam flow into the North Fork of the North Fork American River via Sixmile Creek.

Lake Valley canal diversion dam on the North Fork of the North Fork American River diverts water released upstream from Lake Valley reservoir and Kelly Lake to Lake Valley canal, which delivers up to 36 cfs of water to Drum canal. Drum canal delivers up to 840 cfs to Drum forebay. Drum forebay dam is a 65-foot-high, 4,107-foot-long earth-fill dam. PG&E operates the dam for re-regulating purposes, regulating flow into the Drum no. 1 and no. 2 powerhouse penstocks. Drum forebay dam has a crest elevation of 4,766.5 feet msl. Drum forebay has a usable storage capacity of 436 acre-feet and a surface area of 20 acres. Normal maximum water surface elevation within the reservoir is 4,756.0 feet msl. Drum forebay dam has an 800-foot-long overflow spillway, which is not in use. A 2-foot-diameter pipe with a flow capacity of 80 cfs serves as the low-level outlet.

Drum no. 1 powerhouse penstock and Drum no. 2 powerhouse penstock pass flows up to 643 cfs and 505 cfs from Drum forebay to Drum no. 1 powerhouse and Drum no. 2 powerhouse, respectively. Both powerhouses are located on Drum afterbay (part of the Dutch Flat No. 1 Development). PG&E operates the Drum no. 1 and no. 2 powerhouses semi-automatically as peaking plants generating for daily power demands. Drum no. 1 powerhouse has an installed capacity of 56.4 MW (normal operating capacity is 54.0 MW) with a synchronous generator, three double overhung impulse turbines, and one single overhung impulse turbine with a rated nameplate hydraulic capacity of 643 cfs. Drum no. 2 powerhouse has an installed capacity of 49.5 MW with a synchronous generator, with one vertical impulse turbine with a rated nameplate hydraulic capacity of 505 cfs. The Drum No. 1 and No. 2 Development has a combined dependable capacity of 79.5 MW. Flows through Drum no. 1 and no. 2 powerhouses are discharged into Drum afterbay.

Recreational facilities in Drum No. 1 and No. 2 Development include: Lodgepole campground (35 sites) and Silvertip picnic area and boat launch (10 picnic sites, 20 parking spaces, and a 1-lane concrete ramp), located at Lake Valley reservoir, and Kelly Lake picnic area (5 picnic sites), located at Kelly Lake.

Dutch Flat No.1 Development

The Dutch Flat No. 1 Development includes Drum afterbay and dam, Dutch Flat tunnel and penstock, Dutch Flat no. 1 powerhouse and switchyard, Dutch Flat no.1 transmission line, and Dutch Flat no.2 tie.

Drum afterbay dam is a 102-foot-high, 356-foot-long concrete arch dam located on the Bear River. The dam has a crest elevation of 3,385.0 feet msl. PG&E operates Drum afterbay dam for reregulating purposes, regulating flow from the Bear River into Dutch Flat no. 1 tunnel and penstock. Drum afterbay has a usable storage capacity of 150.4 acre-feet and a surface area of 10 acres. Normal maximum water surface elevation within the afterbay is 3,383.3 feet msl. The dam has an 88.6-foot-long gated spillway controlled with one 20-foot-by-5.5-foot skimmer gate and four 13-foot-by-6-foot radial gates. A 60-inch-diameter sluice pipe and a 10-inch-diameter release with a combined flow capacity of 1,120 cfs serve as low-level outlets. Releases from Drum afterbay dam flow into Dutch Flat afterbay via the Bear River, Dutch Flat no. 1 powerhouse tunnel and penstock, and Dutch Flat forebay (Yuba-Bear Project, Dutch Flat Development) via the Dutch Flat no. 2 flume (Yuba-Bear Project, Dutch Flat Development).

The 12-foot-by-12-foot, 4.1-mile-long Dutch Flat tunnel has a maximum capacity of 475 cfs. The 78- to 96-inch-diameter Dutch Flat no. 1 penstock diverts up to 490 cfs from Drum afterbay to Dutch Flat no. 1 powerhouse. Dutch Flat no. 1 powerhouse is located on Dutch Flat afterbay. PG&E operates

this powerhouse as a semi-automatic plant for limited peaking power demands. The powerhouse has an installed capacity of 22 MW with a synchronous generator, one vertical Francis unit with a rated nameplate hydraulic capacity of 490 cfs, and a dependable capacity of 22 MW. The Dutch Flat no. 1 powerhouse discharges into Dutch Flat afterbay. The Dutch Flat no. 1 transmission line is a 115-kV single-circuit line that extends 0.12 mile from Dutch Flat no. 1 powerhouse to the Drum-Higgins 115-kV transmission line. The Dutch Flat no. 2 tie is a 115-kV single-circuit line that extends 0.41 mile from Dutch Flat no. 2 powerhouse, part of NID's Yuba-Bear Project's Dutch Flat Development, to the 115-kV Drum-Rio Oso no. 1 transmission line.

Halsey Development

The Halsey Development includes the Bear River canal diversion dam, Bear River canal, Halsey forebay and dam, Halsey powerhouse penstock and tunnels, and Halsey powerhouse.

Bear River canal diversion dam is a concrete-fill dam with an unlimited spillway capacity located on the Bear River. Bear River canal diverts up to 490 cfs from the Bear River to Halsey forebay. The canal has open ditch (10 feet wide by 9 feet deep), flume (10 feet wide by 7.8 feet deep), and tunnel (8 feet wide by 11 feet high) sections and a total length of 22.7 miles. Releases from the Bear River canal diversion dam flow into Lake Combie (non-project facility) via the Bear River.

Halsey forebay dam is a 42-foot-high, 850-foot-long earth-fill dam at the downstream end of the Bear River canal that forms Halsey forebay. The dam has a crest elevation of 1,821.4 feet. PG&E operates Halsey forebay for re-regulating purposes, regulating flow into Halsey powerhouse. Halsey afterbay has a usable storage capacity of 238 acre-feet and a surface area of 18 acres. Normal maximum water surface elevation within the afterbay is 1,816.7 feet msl. The dam has an overflow spillway controlled with flashboards. A 2-foot-diameter steel pipe serves as the low-level outlet and has a maximum capacity of 30 cfs. Releases from Halsey forebay dam flow into the Halsey powerhouse penstock.

Halsey powerhouse penstock is a 72-inch-diameter, 1,205-foot-long steel penstock that diverts a maximum of 490 cfs from Halsey forebay to Halsey powerhouse. The Halsey powerhouse tunnels consist of two concrete-lined tunnels with a combined flow capacity of 490 cfs. Halsey powerhouse is located adjacent to Halsey afterbay. PG&E operates Halsey powerhouse semi-automatically based on downstream water demands. Halsey powerhouse has an installed capacity of 11 MW with a synchronous generator, one Francis double-overhung turbine with a rated nameplate hydraulic capacity of 495 cfs, and a dependable capacity of 11 MW. Halsey powerhouse discharges into Halsey afterbay.

The Halsey forebay picnic area (9 picnic sites and 12 parking spaces) is the only recreational facility associated with the Halsey Development.

Wise Development

The Wise Development includes Halsey afterbay dam and afterbay, Upper Wise canal, Rock Creek dam and reservoir, Lower Wise canal, Wise dam and forebay, Wise powerhouse penstock, Wise powerhouses, and one distribution line.

Halsey afterbay dam is a 38-foot-high, 222-foot-long rock-fill dam located on Dry Creek. The dam has a crest elevation of 1,499 feet msl. PG&E operates Halsey afterbay dam for re-regulating purposes diverting flows in Dry Creek and from Halsey powerhouse into Upper Wise canal. During periods of high inflow from Dry Creek into Halsey afterbay, water is occasionally spilled at Halsey afterbay dam into the downstream reach of Dry Creek. Halsey afterbay has a usable storage capacity of 76 acre-feet and a surface area of 10.3 acres. Normal maximum water surface elevation within the

afterbay is 1,494.0 feet msl. The dam has an overflow spillway, and a controlled 2-foot-diameter pipe serves as the low-level outlet.³ Releases from Halsey afterbay flow into Rock Creek reservoir via Upper Wise canal; however, some of this flow discharges downstream as spillage or leakage into Dry Creek or is diverted to meet downstream non-project consumptive water demands by NID and PCWA.

Upper Wise canal is comprised of open ditch (12 feet wide by 8 feet deep), concrete flume, and natural waterway sections and has a total length 2.18 miles. The canal diverts up to 488 cfs to Rock Creek reservoir, also operated as a re-regulating reservoir. As mentioned above, Upper Wise canal delivers water to both Rock Creek reservoir and to downstream areas for consumptive water demands.

Rock Creek reservoir dam is a 36-foot-high, 1,020-foot-long earth-fill and multiple-concrete-arch dam that forms Rock Creek reservoir. The dam has a crest elevation of 1,445.1 feet msl. Rock Creek reservoir has a usable storage capacity of 482 acre-feet and a surface area of 58 acres. Normal maximum water surface elevation within the reservoir is 1,439.6 feet msl. Rock Creek reservoir dam has a 60-foot-long passive overflow spillway. A 2-foot pipe with a maximum capacity of 80 cfs serves as the low-level outlet. PG&E operates the dam for re-regulating purposes. Releases from Rock Creek dam flow into Wise Forebay via Lower Wise canal; however, some of this flow is diverted for NID's water delivery point NID-1 or released downstream in Rock Creek.

Wise Forebay dam is a 20-foot-high, 1,741-foot-long earth-fill dam that forms Wise forebay. The dam has a crest elevation of 1,422.0 feet. Wise Forebay has a usable storage capacity of 32 acre-feet and a surface area of 4.5 acres. Normal maximum water surface elevation within the forebay is 1,418.0 feet msl. The dam has a 130-foot-long uncontrolled overflow spillway, which is not currently in use. A 60-inch pipe with a flow capacity of 32 cfs serves as the low-level outlet. PG&E operates Wise forebay for re-regulating purposes for flows into Wise powerhouse penstock.

Wise powerhouse penstock is a 93- to 96-inch-diameter steel pipe with a total length of 8,580 feet. Wise penstock bifurcates into two separate penstocks about 1,000 feet above the Wise powerhouses, allowing up to 393 cfs to Wise powerhouse and 80 cfs to Wise no. 2 powerhouse. Wise powerhouse is located 1.8 miles downstream of Wise forebay. PG&E operates Wise powerhouse semi-automatically based on downstream consumptive water demand. Wise Powerhouse has an installed capacity of 14 MW with a synchronous generator, one Francis turbine with a rated nameplate hydraulic capacity of 393 cfs, and a dependable capacity of 9.0 MW. Wise powerhouse discharges into South canal, where the flow is either diverted to Auburn Ravine for downstream consumptive water demands or continues to the Newcastle powerhouse header box at the terminus of South canal. The Wise powerhouse distribution line is a 12-kV single-circuit line extending 0.001 mile from Wise powerhouse to a connection with PG&E's interconnected system adjacent to the powerhouse yard.

Wise No. 2 Development

The Wise No. 2 Development consists of Wise no. 2 powerhouse penstock and Wise no. 2 powerhouse. Wise no. 2 powerhouse penstock is a 1,362-foot-long 30- to 60-inch-diameter steel pipe that delivers up to 80 cfs to Wise no. 2 powerhouse. PG&E operates Wise no. 2 powerhouse semi-automatically as a base-loaded plant for downstream water demand. Wise no. 2 powerhouse has an installed capacity of 3.2 MW (normal operating capacity is 3.1 MW) with a synchronous generator, one Francis turbine with a rated nameplate hydraulic capacity of 80 cfs, and a dependable capacity of 3.0 MW. Wise no. 2 powerhouse discharges into South Canal, where the flow is either diverted to Auburn Ravine for consumptive water demands, or continues to the Newcastle powerhouse header box at the terminus of South canal.

³ The low-level outlet pipe is currently blocked by sediment and is not operational.

Newcastle Development

The Newcastle Development consists of South canal, Newcastle powerhouse header box, Newcastle penstock, Newcastle powerhouse, and one transmission line. South canal is comprised of open ditch (6.7 to 10 feet wide by 6 feet deep), flume (9 feet wide by 6 feet deep), and tunnel (6.5 feet wide by 8 feet high) sections with a total length of 5.4 miles. As noted above, South canal currently diverts up to 375 cfs from the two Wise powerhouses to Newcastle powerhouse.⁴ South canal traverses over (or under in the event of a tunnel crossing) the Dutch, Secret, and Miners ravine watersheds, respectively. No water (outside of minimal leakage) is released or spilled from South canal into these drainages. South canal flows are delivered to the Newcastle penstock, a pipe with steel and concrete sections and a capacity of 392 cfs, via the Newcastle powerhouse header box. The header box delivers a minimum instream flow, as well as periodic spills, from the South canal into Mormon ravine.

Newcastle powerhouse is located 6.0 miles downstream of Wise powerhouse and Wise no. 2 powerhouse. PG&E operates the Newcastle powerhouse automatically from the Wise switching center as a base-loaded plant. Newcastle powerhouse has an installed capacity of 11.5 MW with a synchronous generator, one Francis turbine with a rated nameplate hydraulic capacity of 392 cfs, and a dependable capacity of 0 MW. The water discharged from Newcastle powerhouse flows into Folsom Lake (non-project facility operated by Reclamation) via a 0.3-mile reach of Mormon Ravine. The Newcastle powerhouse tap is a 500-foot-long underground 115-kV transmission line that connects Newcastle powerhouse to the Newcastle switchyard for the non-project Placer-Gold Hill no. 1 and no. 2 115-kV transmission lines.

Existing Project Boundary

The existing project boundary, consisting of lands necessary for the safe operation and maintenance of the project and other purposes, such as recreation, shoreline control, and protection of environmental resources, encompasses 5,520.2 acres of land in Nevada and Placer Counties, California.

The majority of land in the project boundary is owned by PG&E (3,443.9 acres). There are 994.0 acres of federal land, of which 978.3 acres are managed by the Forest Service, 5.1 acres are managed by Reclamation, and 10.6 acres are managed by the BLM. The project is also located on 20.4 acres that are administered by California Fish and Wildlife and 1,061.9 acres of privately owned land.

2.1.1.2 Yuba-Bear Project

NID's Yuba-Bear Project is located in the South Yuba River, Middle Yuba River, and Bear River Basins. All project facilities in the Yuba River basin are located in the headwaters of the Middle and South Yuba Rivers and are upstream of the U.S. Army Corps of Engineers Englebright Lake and dam (a non-project facility). The project consists of four developments: Bowman, Dutch Flat, Chicago Park, and Rollins. Among these four developments, there are 13 main dams; 11 reservoirs or impoundments; 4 major water conduits; 4 powerhouses with associated switchyards with a combined authorized installed capacity of 79.32 MW; 1 transmission line; and appurtenant facilities and structures, including recreation facilities. NID not only operates the Yuba-Bear Project for power generation but, in some cases, to meet the downstream consumptive water demands of both NID and PCWA. Each of the developments is described below.

⁴ In 1987, South canal lost capacity due to concrete work on the bottom of South canal downstream of gage YB-132.

Bowman Development

The Bowman Development is composed of Jackson Meadows reservoir, dam, and spillway; Milton Main dam and spillway, Milton South dam, and Milton reservoir; Milton-Bowman diversion conduit; Wilson Creek diversion dam; Jackson Lake, dam and spillway; French Lake, and French dam and spillway; Faucherie Lake, dam, and spillway; Sawmill Lake, dam, and spillway; Bowman Lake; Bowman North dam; Bowman South dam and spillway; Bowman penstock; Bowman powerhouse; and Bowman transmission line.

Jackson Meadows dam is a 195-foot-high, 1,530-foot-long zoned embankment structure that impounds the Middle Yuba River to form Jackson Meadows reservoir. The dam has a crest elevation of 6,044.5 feet msl. Jackson Meadows reservoir has an estimated usable storage capacity of 64,641 acre-feet and a surface area of about 1,008 acres. The normal maximum water surface elevation of the reservoir is 6,036.0 feet msl. The dam includes two low-level outlets with an elevation of 5,933.0 feet msl and a combined maximum design capacity of about 760.1 cfs at full pool. Jackson Meadows dam spillway is a three-bay, gated spillway composed of reinforced concrete. A reinforced concrete chute carries spillway flow about 200 feet past the gates and discharges into a rock-lined channel. Releases from Jackson Meadows dam flow into Milton diversion impoundment via the Middle Yuba River at RM 47.1.

Milton Main dam and Milton South dam impound the Middle Yuba River to form Milton reservoir. Milton main dam is a 37-foot-high, 286-foot-long, concrete arch dam with a crest elevation of 5,690.0 feet msl. The dam includes one low-level outlet with a maximum design capacity of 113 cfs at full pool and one 8-inch valve with a capacity of 5 cfs for minimum instream releases. Milton Main dam spillway acts as an ungated, uncontrolled spillway. Milton South dam is a 30-foot-high, 140-foot-long, concrete arch dam with a crest elevation of 5,696.0 feet msl. Milton reservoir has a gross storage capacity of 275 acre-feet with a surface area of 100 acres. The normal maximum water surface elevation of the reservoir is 5,690.0 feet msl. Milton-Bowman diversion conduit is composed of both pipeline (3,315 feet long, 84-inch-diameter) and tunnel (22,623 feet long, 7.5 feet by 9.5) sections carrying water from Milton reservoir to Bowman reservoir. The majority of flow released from Milton diversion dam flows into Bowman Lake via the Milton-Bowman diversion conduit, and the remaining flow is released to the Middle Yuba River at RM 44.8.

Wilson Creek diversion dam is a grouted rubble matrix dam located on Wilson Creek, 0.4 mile upstream of its confluence with the Middle Yuba River, between Milton reservoir and Bowman Lake. The dam is 3 feet high with a crest elevation of 5,690 feet msl. Releases from Wilson Creek diversion dam continue downstream to the Middle Yuba River.

Jackson dam is a 28-foot-high, 772-foot-long dam, homogenous, compacted, earth-fill dam that impounds Jackson Creek to form Jackson Lake. The dam has a crest elevation of 6,596.0 feet msl. Jackson Lake has a gross storage capacity of 1,330 acre-feet and a surface area of 52 acres. Normal maximum water surface elevation within the reservoir is 6,592.7 feet msl. Jackson dam spillway is a 50-foot-long, uncontrolled, sharp-crested weir with rubble masonry training walls. The dam includes one low-level outlet, with a maximum design capacity of 60 cfs at full pool. Releases from Jackson dam flow into Bowman Lake via Jackson Creek.

French dam is a 70-foot-high, 200-foot-long rock-fill dam with reinforced gunite and shotcrete that impounds Canyon Creek to form French Lake. The dam has a crest elevation of 6,665.0 feet msl. French Lake is a storage reservoir, with a usable storage capacity of 13,940 acre-feet and a surface area of 356 acres. Normal maximum water surface elevation within the reservoir is 6,660.3 feet msl. French dam spillway is an uncontrolled 100-foot-long weir wall constructed of reinforced concrete. The dam

includes one low-level outlet, with a maximum design capacity of 650 cfs at full pool. Releases from French dam flow into Faucherie Lake via Canyon Creek.

Faucherie dam is a 65-foot-high, 665-foot-long zoned embankment dam that impounds Canyon Creek to form Faucherie Lake. The dam has a crest elevation of 6,131.0 feet msl. Faucherie Lake is a storage reservoir with a usable storage capacity of 3,740 acre-feet and a surface area of 150 acres. Normal maximum water surface elevation within the reservoir is 6,123.0 feet msl. Faucherie dam spillway is a 150-foot-long, uncontrolled, 3-foot-high, sharp-crested concrete weir directing spillway discharge into an unlined rock channel that returns discharge to the creek downstream. The dam includes two low-level outlets, with a combined maximum design capacity of 288.5 cfs at full pool. Releases from Faucherie dam flow into Sawmill Lake via Canyon Creek.

Sawmill dam is a 60-foot-high, 384-foot-long rock-fill dam that impounds Canyon Creek to form Sawmill Lake. The dam has a crest elevation of 5,865.0 feet msl. Sawmill Lake is a man-made storage reservoir with a usable storage capacity of 3,030 acre-feet and a surface area of 113 acres. Normal maximum water surface elevation within the reservoir is 5,860.0 feet msl. Sawmill dam spillway is a 230-foot-long, uncontrolled, flat slab and buttress structure and directs spillway discharge into an unlined rock channel that returns discharge to the creek downstream. The dam includes one low-level outlet with a maximum design capacity of 160 cfs at full pool. Releases from Sawmill dam flow into Bowman Lake via Canyon Creek.

Bowman North dam and Bowman South dam impound Canyon Creek to form Bowman Lake. Bowman North dam is a 175-foot-high, 700-foot-long rock-fill dam, with a crest elevation of 5,567.0 feet msl. The dam includes three low-level outlets with a combined maximum design capacity of 400 cfs at full pool. Bowman South dam is a 135-foot-high, 400-foot-long constant radius arch dam constructed in nine monoliths. The dam has a crest elevation of 5,563.6 feet msl. Bowman South dam spillway is a reinforced concrete flat slab and buttress structure with 12 bays, 5 of which permit uncontrolled overflow and 7 of which are fitted with radial gates. The spillway is 175 feet long and is controlled by radial gates. In addition, the Bowman South dam acts as an ungated, uncontrolled spillway with a maximum design capacity of 25,000 cfs. Bowman Lake is a storage reservoir with a usable storage capacity of 68,363 acre-feet and a surface area of 827 acres. Normal maximum water surface elevation within the reservoir is 5,562.0 feet msl. Releases from Bowman Lake flow into Bowman powerhouse penstock.

Bowman penstock is a submerged, concrete-encased, 62-inch-diameter penstock that diverts a maximum of 375 cfs to Bowman powerhouse. Bowman powerhouse is located immediately downstream of Bowman North dam. Bowman powerhouse is located near the base of Bowman North dam, adjacent to Canyon Creek. The powerhouse consists of one horizontal Francis turbine with a nameplate rated capacity of 3.6 MW at a head of 135 feet and a flow of 313 cfs. The flow through Bowman powerhouse discharges into Canyon Creek, where the majority of water is diverted to Fuller Lake via the Bowman-Spaulding conduit (Dutch Flat Development); undiverted flow continues downstream in Canyon Creek and enters the South Yuba River at RM 32.4. Bowman switchyard is adjacent to Bowman powerhouse. Bowman transmission line is an aboveground, 9.0-mile-long, 60-kV line that connects the Bowman powerhouse switchyard to the Drum-Spaulding 60-kV line 1.5 miles west of Spaulding no. 1 powerhouse, part of PG&E's Drum-Spaulding Project.

Recreational facilities associated with the Bowman Development include: Jackson Meadows reservoir recreation area, which consists of Findley campground (14 campsites), East Meadows campground (46 campsites), Fir Top campground (12 campsites), Pass Creek campground (30 campsites), Woodcamp campground (20 campsites), Aspen Group campground (capacity for 100 people-at-one-time [PAOT]), Silvertip group campground (capacity for 50 PAOT), and Jackson Point boat-in campground (10 campsites); Bowman Lake recreation area, which consists of Bowman Lake campground (11 sites),

primitive campsites (14 sites), and informal boat launches (2 ramps); Faucherie Lake recreation area, which consists of Faucherie group campground with a capacity for 50 PAOT and a day-use area; and Canyon Creek campground, which includes 16 developed sites with a capacity for 80 PAOT.

Dutch Flat Development

The Dutch Flat Development is composed of Bowman-Spaulding conduit diversion dam; Bowman-Spaulding conduit; Texas Creek diversion dam; Fall Creek diversion dam and flume; Clear Creek, Trap Creek, and Rucker Creek diversions; Dutch Flat no. 2 conduit; Dutch Flat dam, spillway, and forebay; and Dutch Flat no. 2 powerhouse and penstock.

Bowman-Spaulding conduit diversion dam is a 21-foot-high, 150-foot-long concrete structure, with a crest elevation of 5,400 feet msl. The dam has a 30-inch-diameter low-level outlet with a capacity of 80 cfs used to release instream flows and a canal inlet section used to divert flows directly into the head of the Bowman-Spaulding conduit. The Bowman-Spaulding conduit diverts flows from Canyon Creek below Bowman Lake to Fuller Lake and Lake Spaulding (part of PG&E's Drum-Spaulding Project's Spaulding No. 3 and Spaulding No. 1 Developments, respectively) via 7.7 miles of canals and flumes and 3.1 miles of tunnels. Flow is diverted by the Bowman-Spaulding diversion dam through a 12-foot-wide radial head gate into the conduit. The maximum design capacity of the conduit at the head gate is 300 cfs but increases to 325 cfs at its terminus into Lake Spaulding. Releases from Bowman-Spaulding conduit diversion dam flow into the South Yuba River at RM 32.4 via Canyon Creek.

Texas Creek diversion dam is a 21-foot-high, 50-foot-long, concrete-reinforced diversion dam on Texas Creek, which diverts a portion of flow into the Bowman-Spaulding conduit. The dam has a crest elevation of 5,385.8 feet msl and a low-level outlet with a capacity of 80 cfs. Releases from Texas Creek diversion dam flow into Canyon Creek via Texas Creek.

Fall Creek diversion dam is a 5.5-foot-high, 74.5-foot-long, concrete-reinforced diversion dam on Fall Creek, which diverts a portion of flow into the Bowman-Spaulding conduit. The dam has a crest elevation of 5,368.7 feet msl and a low-level outlet with a capacity of 80 cfs. Fall Creek diversion flume is a 204-foot-long, 6-foot-4-inch-diameter steel flume that diverts water from Fall Creek diversion dam to the Bowman-Spaulding conduit. The maximum design capacity of the flume is 100 cfs. Releases from Fall Creek diversion dam flow into the South Yuba River at RM 35.6 via Fall Creek.

Other Bowman-Spaulding conduit diversions include Clear Creek, Trap Creek, and Rucker Creek diversions, each of which diverts the entire streamflow. These diversions occur as each creek flows over the upstream wall or section into the Bowman-Spaulding conduit. Dump gates are located in the downstream side of the conduit and make releases into drainages.

Dutch Flat no. 2 flume is a 24,728-foot-long combination of tunnel, flume, siphon, and canal that diverts water from Drum afterbay, part of PG&E's Drum-Spaulding Project's Dutch Flat No. 1 Development, to Dutch Flat no. 2 forebay at a maximum design capacity of 610 cfs. Dutch Flat no. 2 forebay dam is a 77-foot-high, 440-foot-long, zoned, earth-fill embankment dam adjacent to the Bear River that forms Dutch Flat no. 2 forebay. The dam has a crest elevation of 3,336.0 feet msl. Dutch Flat no. 2 forebay is an off-stream, re-regulating reservoir with a usable storage capacity of 159.8 acre-feet and a surface area of 8 acres. Normal maximum water surface elevation within the forebay is 3,330.0 feet msl. Dutch Flat no. 2 forebay dam does not include a low-level outlet because it is an off-stream facility connected to the Dutch Flat no. 2 powerhouse penstock. Dutch Flat no. 2 forebay has an uncontrolled, 250-foot-long concrete spillway. Discharge from the spillway is routed through two 60-inch-diameter metal pipes down to a spillway channel to the Bear River.

Dutch Flat no.2 powerhouse penstock is a 1,370.2-foot-long, 8-foot-diameter steel penstock that releases water, at a maximum design capacity of 610 cfs, from Dutch Flat no. 2 forebay to Dutch Flat no. 2 powerhouse. Dutch Flat no. 2 powerhouse is located adjacent to Dutch Flat afterbay, on the Bear River. Dutch Flat no.2 powerhouse is an aboveground, outdoor powerhouse constructed of reinforced concrete. The powerhouse consists of one vertical axis Francis turbine with a nameplate rated capacity of 24.6 MW and a flow capacity of 600 cfs. Dutch Flat no. 2 powerhouse discharges into Dutch Flat afterbay.

Chicago Park Development

The Chicago Park Development is composed of Dutch Flat afterbay dam, spillway, and afterbay and Chicago Park conduit, forebay dam, spillway, forebay, penstock, and powerhouse.

Dutch Flat afterbay dam is a 165-foot-high, 495-foot-long zoned embankment dam with rock-fill shells that impounds the Bear River to form Dutch Flat afterbay. The dam has a crest elevation of 2,755.0 feet msl. Dutch Flat afterbay is a re-regulating reservoir with a usable storage capacity of 1,359.2 acre-feet and a surface area of 38 acres. Normal maximum water surface elevation within the afterbay is 2,741.0 feet msl. Dutch Flat afterbay spillway is an uncontrolled, 100-foot-wide, concrete-lined spillway with a crest elevation of 2,741.0 feet msl. Discharge goes over an ogee crest and down a 405-foot-long concrete chute that discharges into the Bear River. Dutch Flat afterbay dam includes two low-level outlets with a combined maximum design capacity of 150 cfs at full pool. Releases from Dutch Flat afterbay dam flow into Rollins reservoir via the Bear River.

Chicago Park flume diverts water from Dutch Flat afterbay dam to Chicago Park forebay via 16,225 feet of concrete flume (18 feet wide by 10 feet deep) and gunite-lined ditch (14 feet wide and 10 feet deep). Maximum design capacity of the conduit is 1,100 cfs. Chicago Park forebay dam is a 35-foot-high, 200-foot-long earth-fill dam with gunite face located off-stream, adjacent to the Bear River, and forms Chicago Park forebay. The dam has a crest elevation of 2,720.0 feet msl. Chicago Park forebay is a re-regulating reservoir, with a usable storage capacity of 103 acre-feet and a surface area of 7 acres. Normal maximum water surface elevation in the forebay is 2,716 feet msl. Chicago Park forebay dam spillway is an uncontrolled side-channel spillway 40 feet in length and is located on the Chicago Park conduit, 0.5 mile above the Chicago Park powerhouse penstock intake structure. Chicago Park forebay dam includes one low-level outlet with a maximum design capacity of 75 cfs. Releases from Chicago Park forebay dam flow into the Chicago Park powerhouse penstock.

Chicago Park powerhouse penstock is a 2,200-foot-long, 9.25- to-10.0-foot-diameter steel penstock that diverts water, at a maximum design capacity of 1,167 cfs, from Chicago Park forebay to Chicago Park powerhouse. Chicago Park powerhouse is located adjacent to the Bear River, 800 feet southeast of the confluence of the Bear River and Steephollow Creek. The powerhouse consists of one vertical axis Francis turbine with a nameplate rated capacity of 39 MW at a head of 480 feet and a maximum flow of 1,100 cfs. Chicago Park powerhouse discharges into the Bear River upstream of Rollins reservoir.

Rollins Development

The Rollins Development is composed of Rollins dam, spillway, reservoir, penstock, and powerhouse. Rollins dam is a 252.5-foot-high, 1,260-foot-long, zoned embankment dam that impounds the Bear River to form Rollins reservoir. Rollins dam has a crest elevation of 2,187.5 feet msl. Rollins reservoir is a storage reservoir, with a usable storage capacity of 54,453 acre-feet and a surface area of 788 acres. Normal maximum water surface elevation within the reservoir is 2,171.0 feet msl. Rollins dam spillway is an uncontrolled concrete ogee crest spillway 620 feet in length, with a crest elevation of 2,171.0 feet msl and a maximum design capacity of 70,000 cfs. Rollins dam includes one low-level with

a maximum design capacity of 2,000 cfs at full pool. Releases from Rollins dam flow into the Rollins powerhouse penstock.

Rollins powerhouse penstock is a 524-foot-long, 8.5-foot-diameter, steel penstock partially encased in concrete that diverts water, at a maximum design capacity of 840 cfs, from Rollins dam to Rollins powerhouse. Rollins powerhouse is located at the toe of Rollins dam. Rollins powerhouse is an aboveground, outdoor powerhouse constructed of reinforced concrete. The powerhouse consists of one vertical axis Francis turbine with a nameplate rated capacity of 12.2 MW at a head of 208 feet and a maximum flow of 840 cfs. Rollins powerhouse discharges into the Bear River and enters Bear River canal diversion impoundment at RM 10.4. Releases from Bear River canal diversion dam continue downstream in the Bear River to Lake Combie at RM 0.0.

Recreational facilities in Rollins Development are located at Rollins reservoir recreation area, which consists of 4 project recreation facilities at Rollins reservoir: Peninsula campground (67 campsites); Greenhorn campground (79 campsites); Long Ravine campground (85 campsites); and Orchard Springs campground (101 campsites). Each facility includes a boat launch.

Existing Project Boundary

The existing project boundary, consisting of lands necessary for the safe operation and maintenance of the project and other purposes, such as recreation, shoreline control, and protection of environmental resources, encompasses 6,252.6 acres of land in Nevada, Placer, and Sierra Counties, California.

The majority of land in the boundary is owned by NID (4,056.3 acres). There are 1,749.3 acres of federal land, of which 1,540.8 acres are managed by the Forest Service as part of the Tahoe National Forest and 208.5 acres are managed by BLM as part of the Sierra Resource Management Area, and 447.0 acres of privately owned land.

2.1.2 Project Safety

The Drum-Spaulding and Yuba-Bear Projects have been operating under the existing licenses for more than 49 years, and during this time Commission staff have conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operation, compliance with the terms of the licenses, and proper maintenance. In addition, each project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report for each project has been filed for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under new licenses. Special articles would be included in any licenses issued, as appropriate. Commission staff would continue to inspect the projects during the new license terms to assure continued adherence to Commission-approved plans and specifications; special license articles relating to construction (if any), operation, and maintenance; and accepted engineering practices and procedures.

2.1.3 Existing Project Operation

The Drum-Spaulding and Yuba-Bear Projects are multi-use systems that provide both power and non-power benefits to PG&E's and NID's electricity customers, local water customers, and California residents. The projects' power benefits include low-cost, base-load Renewables Portfolio Standard electricity, load-following energy, and dependable capacity. As described above, the two projects are interconnected at both upstream and downstream reaches, and they are operated largely in tandem.

2.1.3.1 Drum-Spaulding Project

The Drum-Spaulding Project has a usable storage of about 151,355 acre-feet of water, generated an annual average of 794 GWh from 1972 (the first full year of generation) to 2007, and has a historical dependable capacity of 142 MW. With the conditions of the applicants' No-action Alternative Operations Model, the project's average annual energy is 750 GWh with a total dependable capacity of 139.8 MW.⁵

The project's larger reservoirs (Fordyce Lake, Lake Spaulding, and Lake Valley reservoir) operate as storage reservoirs to capture rain and snowmelt during the spring and summer months and are slowly drawn down through summer and fall months, releasing water for power generation, irrigation, and domestic consumption purposes. These reservoir dams have spill gates or flashboard structures, which are used to optimize the storage in the reservoirs during the snowmelt period. In particular, Lake Spaulding is a "hub" for conveyance of upstream regulated releases (primarily Fordyce Lake) along with water transfers into (via NID's Yuba-Bear Project Bowman-Spaulding conduit) and out of (via South Yuba canal and Drum canal) the reservoir. Combined with the large, high-elevation, unimpaired watershed above Lake Spaulding and subsequent snowmelt runoff forecasting, reservoir operations at Lake Spaulding are the most complex of any in the project. Using its SOCRATES forecasting model, PG&E develops a water management plan in order to achieve end-of-the-month storage targets for the three major project storage reservoirs.

Meadow Lake, White Rock Lake, and Lake Sterling are examples of other reservoirs in the system that are operated as fill and spill reservoirs; the dams have passive spillways that overtop when the water level exceeds the storage capacity of the dam but do not have spill gate structures. The forebays and afterbays, including Deer Creek, Drum, Halsey, Dutch Flat, Alta, and Wise, have minimal usable storage capacities and are operated as regulating reservoirs, reshaping and diverting flows from upstream storage reservoirs for power generation, irrigation, and consumption purposes.

Nine powerhouses (Spaulding no. 1, no. 2, and no. 3; Deer Creek, Alta, Halsey, Wise, Wise no. 2, and Newcastle) are operated as base-loaded plants. Dutch Flat no. 1 powerhouse is operated for intermediate amounts of peaking (limited by diurnal storage availability in the forebay and afterbay of the powerhouse), and the Drum no. 1 and no. 2 powerhouses are operated as peaking plants.

PG&E implements hydrologic and hydraulic operation planning for the project to manage basin runoff throughout the annual hydrologic cycle for irrigation, municipal water supply, recreation, and power generation. The project utilizes storage capacity within its reservoirs to store spring runoff that occurs during the snowmelt season. Stored water is gradually released during summer and fall to augment streamflows, provide hydroelectric generation, and meet consumptive water demands. The storage reservoirs are generally operated in accordance with target storage curves to achieve reservoir levels and storage capacity that manages the available water effectively.

⁵ The difference in generation and dependable capacity between historical operations and the no-action alternative due in large part to the following operational project differences incorporated in the No-action Alternative Operations Model: (1) retirement of PG&E's Alta powerhouse unit 2, which ceased operations in 2007; (2) decommissioning of the Jordan Creek diversion and associated conveyance system in the Spaulding No. 3 Development; (3) re-operation between PG&E's Dutch Flat no. 1 powerhouse and NID's Dutch Flat no. 2 powerhouse based on water rights rather than operational or efficiency considerations; (4) modified winter/spring operations in both projects implemented since 1997 and applied to the model beginning in 1976; (5) use of usable storage estimates generated by updated bathymetric surveys in several project reservoirs of both projects; and (6) the use of average water delivery demand from 2001 to 2009 rather than historical water delivery demand for both projects.

PG&E conducts operation planning forecasting for the project in cooperation with NID. Together, the two entities perform monthly snow surveys in the project watershed during the winter and, combined with snow course data from the California Department of Water Resources (California DWR), provide this information to PG&E's hydrologists who use these data to develop runoff forecast models. In addition, PG&E uses larger scale snowmelt runoff forecasts generated by the California DWR in the form of Bulletin 120 water year forecasts (provided as "South Yuba River at Lang's Crossing," which is just downstream of Lake Spaulding dam). These data are shared with NID to determine best operational practices.

In general, weekly and daily operation of the Drum-Spaulding Project is prioritized for facility and public safety, regulatory compliance, and to balance irrigation and domestic consumptive water demands with power generation. The project is also operated to comply with PG&E's existing water rights licenses and permits.

2.1.3.2 Yuba-Bear Project

The Yuba-Bear Project has a usable storage of about 212,847 acre-feet of water, generated an annual average of 354.3 GWh from 1972 through 2007 (periods for Rollins and Bowman powerhouses are shorter as they came online in 1981 and 1986, respectively), and has a historical dependable capacity of 44.2 MW. With the conditions of the applicants' No-action Alternative Operations Model, the project's average annual energy is 266 GWh with a total dependable capacity of 47 MW.⁶

In general, the Yuba-Bear Project is characterized by high-elevation storage and lower-elevation power generation via a network of natural and constructed conveyances. Water is stored and released from the upper reservoirs of the project (also known as the "Mountain Division") based on NID's consumptive needs and combined reservoir storage targets developed with PG&E. Discretionary releases are made from Jackson Meadows reservoir and Jackson, French, Faucherie, and Sawmill Lakes during the spring runoff season through late fall. These releases are conveyed to Bowman Lake via the Milton-Bowman tunnel (releases from Jackson Meadows reservoir), Jackson Creek (releases from Jackson Lake), and Canyon Creek (releases from French, Faucherie, and Sawmill Lakes). This water is then stored and released by Bowman dam through Bowman powerhouse into the Bowman-Spaulding conduit diversion impoundment.

While the majority of the Bowman-Spaulding conduit flow is provided by releases at Bowman Lake, five small diversion structures (known as "feeders") on creeks that run perpendicular to the alignment of the Bowman-Spaulding conduit also provide water to the conduit some of which is used by NID for consumptive deliveries after passing through PG&E's Drum-Spaulding Project generating facilities. These feeders augment flows in the conduit up to its capacity, and spill the remainder into their respective natural drainages downstream of the conduit.

Flows upstream of the Bowman-Spaulding conduit in Texas, Fall, Lake, and Rucker Creeks are regulated by upstream reservoirs owned and operated by PG&E as part of the Drum-Spaulding Project

⁶ The difference in generation and dependable capacity between historical operations and the no-action alternative is due in large part to the following operational project differences incorporated in the No-action Alternative Operations Model: (1) re-operation between PG&E's Dutch Flat no. 1 and NID's Dutch Flat no. 2 powerhouses based on water rights rather than operational or efficiency considerations; (3) modified winter/spring operations in both projects implemented since 1997 and applied to the model beginning from 1976; (4) use of usable storage estimates generated by updated bathymetric surveys in several project reservoirs of both projects; and (5) the use of average water delivery demand from 2001 to 2009 rather than historical water delivery demand for both projects.

(Spaulding No. 3 Development). These are Culbertson, Upper Rock, Lower Rock, Upper Lindsey, Middle Lindsey, and Lower Lindsey Lakes in the Texas Creek watershed; Carr and Feeley Lakes in the Fall Creek watershed; and Blue and Rucker Lakes in the Rucker Creek watershed. Bowman-Spaulding conduit discharges into PG&E's Fuller Lake (Drum-Spaulding Project, Spaulding No. 3 Development), where it then is diverted to a second section of the Bowman-Spaulding conduit before it is utilized by PG&E for power generation at Spaulding no. 3 powerhouse (Drum-Spaulding Project, Spaulding No. 3 Development). PG&E then passes this water through Lake Spaulding into the South Yuba River, Spaulding no. 1 and no. 2 powerhouses, the Drum canal (Drum-Spaulding Project, Drum Development), and the South Yuba canal (Drum-Spaulding Project, Deer Creek Development). Water transported into Drum canal is passed through PG&E's Drum forebay, used by PG&E for power generation at Drum no. 1 and no. 2 powerhouses, and then diverted from PG&E's Drum afterbay, located on the Bear River, into the Dutch Flat no. 2 flume, forebay, and powerhouse (Yuba-Bear Project, Dutch Flat No. 2 Development). Water transported by PG&E into the South Yuba canal is passed through PG&E's Deer Creek forebay and Deer Creek powerhouse (Drum-Spaulding Project, Deer Creek Development) prior to being released into South Fork Deer Creek. NID re-diverts most of this water out of South Fork Deer Creek, 0.1 mile downstream, to meet consumptive demand. Daily volumes into each canal are scheduled by PG&E and NID for downstream consumptive demand and discretionary hydropower generation.

Water from the project's Dutch Flat no. 2 powerhouse and PG&E's Dutch Flat no. 1 powerhouse (Drum-Spaulding Project, Dutch Flat No. 1 Development) discharges into the project's Dutch Flat afterbay located on the Bear River, where the water is then delivered via the Chicago Park flume to the project's Chicago Park powerhouse by way of the project's Chicago Park forebay. Daily volumes are scheduled for downstream consumptive demand and discretionary hydroelectric power generation. These waters are discharged into the Bear River roughly 1.5 miles upstream of the high water line of the project's Rollins reservoir.

Rollins reservoir is the project's major low-elevation storage reservoir and serves as a multipurpose facility that meets municipal, irrigation, domestic water supply, recreation, and power generation needs. Rollins reservoir is generally kept as high as possible through the recreation season of Memorial Day through Labor Day. This is accomplished through upstream deliveries into the Bear River watershed by PG&E's Drum and Lake Valley canals (Drum-Spaulding Project, Drum No. 1 and No. 2 Development). Drum canal is supplied by a combination of NID's water transfers out of the Middle Yuba River (via the Milton-Bowman tunnel) and Canyon Creek (via the Bowman-Spaulding conduit) watersheds, along with PG&E reservoirs and natural runoff in the South Yuba and North Fork of the North Fork American River watersheds.

A significant decrease in reservoir storage is generally experienced during the outage period of Drum canal, which occurs in the last 2 weeks of September each year. Rollins reservoir storage is generally recovered through natural runoff and canal flows in the fall and early winter months. Drum and Dutch Flat afterbays are negligibly affected due to their relatively low minimum instream flow requirements, but Rollins reservoir is significantly affected due to the relatively high level of instream flow and water delivery demands from the reservoir in this time period.

Bowman powerhouse is operated as a base-loaded plant to meet daily downstream water demands. Dutch Flat no. 2 and Chicago Park powerhouses are operated to meet intermediate loads with some peaking operation. Rollins powerhouse is operated as a base-loaded plant generating power according to irrigation water demand and water conditions.

2.1.4 Existing Environmental Measures

2.1.4.1 Drum-Spaulding Project

The license for the Drum-Spaulding Project (article 39) includes the minimum flow requirements shown in tables 2-1 and 2-2.

Table 2-1. Existing minimum flow requirements for the Drum-Spaulding Project in Upper Rock Lake, Lower Rock Lake, Middle Lindsey Lake, Lower Lindsey Lake, Feeley Lake, Carr Lake, Blue Lake, Rucker Lake, and Culberston Lake.^a (Source: PG&E, 2011a)

Release Location	Period	Target Flow (cfs)	Allowable Minimum Flow (cfs)
Upper Rock Lake	7/1-9/30	0.25	0.1
Lower Rock Lake	7/1-9/30	0.25	0.1
Middle Lindsey Lake	7/1-9/30	0.25	0.1
Lower Lindsey Lake	Year-long	0.5	0.2
Feeley Lake (Upper)	Year-long	0.5	0.2
Carr Lake (Lower Feeley)	Year-long	0.5	0.2
Blue Lake	Year-long	0.5	0.2
Rucker Lake	Year-long	0.5	0.2
Culberston Lake	Year-long	0.75	0.3

^a During dry years, these flows shall be adjusted according to the following formula: $(0.8 * [\text{storage}^{\text{July 1}}] * 0.504) / 123$, where 0.8 is used to account for evaporation in the lake; 0.504 is the conversion from acre-feet to cfs; and 123 is the number of days from July 1 to October 31.

Table 2-2. Existing minimum flow requirements for the Drum-Spaulding Project in Fordyce Creek below Fordyce Lake, South Yuba River below Lake Spaulding, South Yuba River below Langs Crossing, Bear River in Bear Valley above Drum afterbay, Bear River below Drum afterbay, Canyon Creek below Towle diversion, and Bear River below Upper Boardman canal. (Source: PG&E, 2011a)

Stream	Period	Minimum Flow (cfs)	Qualifications
Fordyce Creek below Fordyce Lake	Year-long provided that sufficient lake storage shall be reserved at the time of outlet adjustment for unattended winter operation to ensure an initial flow of 5 cfs and not less than 3 cfs at lake level of maximum winter drawdown	5.0	Lake storage in excess of these releases to be prorated over the period July 1 to the date of winter operational adjustment without causing Spaulding reservoir to spill; Fordyce Lake not to be drawn down below 3,000 acre-feet of storage
South Yuba River below Lake Spaulding	Year-long	1.0	None
South Yuba River Langs Crossing	Year-long	5.0	To be released from Lake Spaulding
Bear River (0.1 mile below the site of the California Fish and Wildlife's Bear River fish planting base in Bear Valley) ^a	Year-long	5.0	None
Bear River below Drum afterbay	3/1-9/30	Normal year 10.0 Dry year 5.0	Dry year conditions are deemed to exist in the month following whenever the accumulated seasonal precipitation at Lake Spaulding commencing with Oct. 1 is equal to or less than: 29 inches as of Jan. 31, 35 inches as of Feb. 28-29, 40 inches as of March 31, 45 inches <i>[as of April 30; provided that if total precipitation by April 30 is 45 inches or less, dry year conditions are deemed to exist for the remainder of the year.]</i> (Note: <i>The latter part of the above text in italics was omitted in the August 14, 1980 order).</i>
	10/1-2/28-29	Normal year 10.0 Dry year 5.0	
Canyon Creek below Towle diversion	Year-long	1.0	Or natural streamflow, whichever is less
Bear River below Upper Boardman canal	Year-long	1.0	Or natural streamflow, whichever is less

Table 2-2. Existing minimum flow requirements for the Drum-Spaulding Project in Fordyce Creek below Fordyce Lake, South Yuba River below Lake Spaulding, South Yuba River below Langs Crossing, Bear River in Bear Valley above Drum afterbay, Bear River below Drum afterbay, Canyon Creek below Towle diversion, and Bear River below Upper Boardman canal. (Source: PG&E, 2011a)

Stream	Period	Minimum Flow (cfs)	Qualifications
Mormon Ravine above Newcastle powerhouse	Year-long	5.0	No minimum flow required during South Canal outage.

^a The proposed California Fish and Wildlife Bear River Fish Planting Base in Bear Valley was never constructed; the minimum flow requirement is currently measured at PG&E's Gage YB-198.

The license provides that PG&E regulate downstream releases in as near uniform flow as possible, and provides further that PG&E conduct the normal operations of the Bear River waste gate so as to provide gradual changes in rates of releases from the Drum canal into the Bear River as possible excepting emergencies and allowances for the safety of the Drum canal.

The license also requires that the project maintain water levels in project reservoirs as shown in table 2-3 (article 40).

Table 2-3. Existing Drum-Spaulding Project reservoir level requirements. (Source: PG&E, 2011a)

Reservoir	Water Level Schedule
Meadow Lake	Maximum level consistent with project operation June 1 to August 1
Rucker Lake	Maximum level consistent with project operation June 1 to September 1
Sterling Lake	
Lower Rock Lake	
Lower Feeley Lake	
Fuller Lake	Maximum level consistent with project operations year round; any necessary drawdowns not to decrease the level below the bottom elevation of NID's outlet ditch
Upper Lindsey Lake	Level as permitted with no drawdown for irrigation or power purposes
Upper Cascade (Peak) Lake	Maximum level consistent with project operations and with use of the storage to maximize recreational use of the lakes and to augment the flow of the South Yuba River during the fall months
Lower Cascade (Peak) Lake	
Rock Creek Reservoir	Maximum level consistent with project operation June 1 to September 1
Halsey forebay	
Halsey afterbay	
White Rock Lake	Consistent with project operations; storage level used to augment flows into North Creek during summer and fall months.

PG&E is required to operate project reservoirs during flood conditions so that releases are no more than would have occurred under natural stream conditions (article 38).

PG&E is required to, in consultation with the U.S. Geological Survey (USGS), install and maintain recorders for determining the stage and flows in streams from which water is diverted or released, and the amount of water held in storage (article 6).

The license provides that PG&E construct and maintain deer-proof fences, crosswalks, escape ramps, and such other reasonable structures necessary to protect deer as may be prescribed by the Forest Service, California Fish and Wildlife, and FWS (article 42).

The license requires that, prior to any ground-disturbing activity, PG&E consult with the SHPO and the Forest Service, if the work is on National Forest System (NFS) land, about the need for a cultural resources survey and salvage work (article 65).

In addition to the FERC license requirements, PG&E entered into three agreements with resource agencies that included various streamflow-related requirements, which are summarized below.

In an April 11, 1963, agreement between PG&E, the Forest Service, and California Fish and Wildlife, which expires April 30, 2013, PGE& agreed to release 1 cfs in the North Fork of the North Fork American River below Lake Valley reservoir and 1 cfs below Lake Valley canal diversion dam (although 3 cfs is the current minimum flow per a water rights permit-related “agreement” in the mid-1980s with California Fish and Wildlife). PG&E also agreed to drawdown provisions for Kelly Lake and Kidd Lake (modified in the June 22, 1979, agreement below) and provisions to use storage in White Rock Lake to augment flow of North Creek in summer and fall months.

A June 22, 1979, letter agreement between PG&E, California Fish and Wildlife, and the Forest Service acted as an interim modification to the 1963 agreement. In this agreement, PG&E agreed to make releases from Kidd Lake and Upper and Lower Peak (Cascade) Lakes to maintain a minimum flow of 5 cfs and a maximum water temperature of 70 degrees Fahrenheit (°F) in the South Yuba River, as measured at Cisco Grove, consistent with the primary purposes of the project and as water conditions permit, although releases from these reservoirs prior to September 1 should be controlled to keep the lake water surfaces as high as reasonably possible during the recreation season.

Finally, in an April 21, 1987, “letter agreement” between PG&E and California Fish and Wildlife, PG&E agreed to bypass 0.25 cfs year-round in Little Bear River below Alta powerhouse.

2.1.4.2 Yuba-Bear Project

The license (article 69) for the Yuba-Bear Project requires NID to consult annually with the Forest Service, FWS, and other resource agencies with regard to measures needed to ensure protection and development of the natural resource values of the project area, and to file with the Commission within 2 months of the consultation a report that includes any recommendations made by the agencies.

The license (articles 32 and 33) includes the minimum flow requirements shown in table 2-4.

Table 2-4. Existing minimum flow requirements for the Yuba-Bear Project. (Source: NID, 2011a)

From	To	Release (cfs)	Period	Applicable Water Year Type
Jackson Meadows dam	Middle Yuba River	5	Continuous	All
Milton diversion dam	Middle Yuba River	3	Continuous	All

From	To	Release (cfs)	Period	Applicable Water Year Type
Jackson Lake dam	Jackson Creek	0.75	Continuous	All
French Lake dam	Canyon Creek to Bowman Reservoir	2.5	Continuous	All
Bowman-Spaulding diversion dam	Canyon Creek	3	4/1-10/31	All
		2	11/1-3/31	
Dutch Flat afterbay dam	Bear River	10	5/1-10/31	All
		5	11/1-4/30	
Rollins dam ^a	Bear River	75	5/1-10/31	Normal ^b
		20	11/1-4/30	
		40	5/1-10/31	Less than Normal ^b
		15	11/1-4/30	

^a As measured at the Colfax-Grass Valley streamflow gage (Bear River at Highway 174 crossing).

^b Normal and less than normal are based on monthly precipitation at Lake Spaulding.

The license (article 34) also requires the project to adhere to the following ramping rates:

- Jackson Meadows Dam: no more than releases of 15 cfs over 30 minutes when releases are in the range of 5 to 125 cfs, or greater than 15 cfs over 15 minutes when releases are at a level of 125 cfs or greater. In addition, the flow changes in the Middle Yuba River below Jackson Meadows dam are limited to four changes (i.e., two increases and two decreases) per year, except in cases of emergency and/or uncontrolled spills.
- Rollins Dam: 1 foot in 6 hours or 3 inches during any 1 hour as measured at the Colfax-Grass Valley streamflow gage.

The license (articles 29, 30, and 31) for the project includes the following reservoir pool limitations:

- Jackson Meadows Reservoir: in normal and wet water years, not less than 10,000 acre-feet from October 1 through May 31 and not less than 21,000 acre-feet from June 1 through September 30; and in dry water years, not less than 3,000 acre-feet from October 1 through May 31 and not less than 21,000 acre-feet from June 1 through September 30. For the purpose of this measure, a dry year is one in which the April-July runoff forecast made by the California DWR on May 1 for the Bowman area-Middle Yuba River and Canyon Creek is for less than 70,000 acre-feet.
- Milton Diversion Dam Impoundment: an elevation of 5,686 feet msl year-round except when repair to the Milton-Bowman tunnel is necessary, at which time the normal pool may be drawn to a minimum elevation of 5,678 feet msl.
- Rollins Reservoir: a minimum pool year-round of not less than 5,000 acre-feet.

NID is required to, in consultation with USGS, install and maintain recorders for determining the stage and flows in streams from which water is diverted or released, and the amount of water retained in storage (article 6).

The license (article 35) provides that NID cooperate with the Forest Service, FWS, and California Fish and Wildlife in planning the location of deer-proof fences, crosswalks, escape ramps, and such other reasonable structures necessary to protect deer and to maintain these facilities.

The license (article 77) prohibits the use of pesticides or herbicides on NFS lands for any purpose without the prior written approval of the Forest Service.

The license (article 78) requires that prior to any ground-disturbing activity, NID consult with the California SHPO and the Forest Service, if the work is on NFS land, about the need for a cultural resources survey and salvage work.

2.2 APPLICANTS' PROPOSALS

2.2.1 Proposed Project Facilities

2.2.1.1 Drum-Spaulding Project

PG&E proposes to retire Alta powerhouse unit 2; modify flow-release facilities; decommission and remove the Jordan Creek diversion; build new recreation facilities; and rehabilitate existing recreation facilities. In addition, PG&E proposes to add some existing roads to the project boundary and split the current Drum-Spaulding Project into two new licensed projects.

Generation Facilities

PG&E does not propose to add any new generation facilities to the project. However, PG&E proposes to retire Alta powerhouse unit 2, which it no longer operates. In 2007, PG&E removed the lower 100 feet of the original 48-inch-diameter penstock to the Alta powerhouse and installed about 40 feet of new 36-inch-diameter penstock and manifold connection to unit 1. PG&E did not connect unit 2 because the powerhouse is operated primarily for PCWA water demand, and PG&E determined that demand can be met through the operation of a single unit. PG&E decommissioned unit 2 at that time and left the unit intact but hydraulically disconnected from the penstock.⁷

Recreation Facilities

PG&E also proposes to build new recreation facilities and rehabilitate existing recreation facilities. A brief summary of the proposed new facilities is provided below.

⁷ Each of the two units in Alta powerhouse, located on the Little Bear River, consists of a Pelton single overhung impulse turbine. Water supply for Alta powerhouse originates from Drum forebay, where it is released through the low-level outlet through the Towle diversion into Canyon Creek and then diverted downstream at Towle canal diversion dam into Towle canal, which conveys the water 3.9 miles before discharging into Alta forebay. Alta powerhouse discharges into the tailrace where it is diverted into PCWA's Lower Boardman canal (a non-project facility) for domestic and irrigation use. Historically, PCWA's water demand in the Lower Boardman canal has ranged from a low of 2 cfs to a maximum of 22 cfs. A fixed orifice at the diversion gate releases a minimum constant flow of 0.25 cfs in the Little Bear River below the powerhouse. With the exception of a few weeks during the spring runoff period, Alta powerhouse is operated to meet PCWA's demand downstream. With unit 2 retired, the maximum capacity of the remaining unit would be 28 cfs.

- Meadow Lake: develop a rustic three-unit picnic area, parking area with up to eight parking spaces, and turn-around for launching boats near the existing Meadow Lake campground and informal boat launch. Install a potable water system at the existing Meadow Lake campground. Install a one-unit vault toilet at the existing Meadow Lake shoreline campsites.
- Lake Sterling: designate three primitive campsites each with a steel fire ring, animal-resistant food locker, and information signs on the east side of the reservoir; install a host site near the reservoir.
- Fordyce Lake: develop a primitive campground with up to 10 campsites along Fordyce Lake Road. Each campsite will include a fire ring, animal-resistant food locker, and a site marker. The facility will also include a one-unit composting toilet, facility identification sign, and improved information signs at the information board.
- Lake Spaulding: designate three boat-in shoreline campsites with steel fire rings and animal-resistant food lockers at least 100 feet from the high water line on the north side of the reservoir. Establish and maintain appropriate fire safe vegetation clearances at each boat-in campsite.
- Lower Lindsey Lake: reconstruct the existing rustic Lower Lindsey Lake campground to a Development Scale 2 campground including gravel roads and spurs, and installation of vehicle barriers.
- Fuller Lake: expand the parking area by lengthening the parking spaces to 40 feet for vehicles and trailers; re-route the paved entrance road to allow for the expanded parking. Install an accessible⁸ fishing pier including accessible parking and access route to the pier.
- Lower Peak Lake: designate up to five primitive campsites, each with a steel fire ring and an animal-resistant food locker along the shoreline.
- Lake Valley Reservoir: develop a new group campground for 50 to 100 people, and when monitoring triggers are reached, develop a new 35-unit family campground.
- Wise Forebay: install an asphalt parking area for up to five vehicles on PG&E property on the southwest corner of the forebay.

Flow-Release Facilities

As part of proposed aquatic measures (see section 2.2.3, *Proposed Environmental Measures*), PG&E proposes new or modified flow-release facilities, as described below.

- South Yuba below Spaulding Dam: modify Lake Spaulding dam low-level outlet to release a minimum streamflow of 90 cfs, add control valves, improve gage YB-29, and modify and improve control systems.
- Lake Valley Reservoir Dam Reach near YB 104: modify gage YB-104 for full flow, add energy dissipater, and modify downstream channel.

⁸ PG&E and NID use the term “accessible” in reference to Americans with Disabilities Act Accessibility Guidelines, Forest Service Outdoor Recreation Accessibility Guidelines, and/or Architectural Barriers Act Accessibility Standards.

- Towle Canal Diversion Dam Reach: modify existing gates to release increased minimum streamflow of 3 cfs and modify existing weir.
- Bear River below Drum Canal at YB-137: design and install two fixed plate orifice outlet pipes for a capacity of 1 cfs each.

Jordan Creek Diversion

PG&E proposes to remove the Jordan Creek diversion and associated conveyance system in the Spaulding No. 1 and No. 2 Development. PG&E explains that the diversion dam and conveyance system are not needed for project operations and have not been used for many years.

Project Boundary

In June 2010, PG&E submitted mapping corrections related to a transmission line separation, adjustments to canal widths to reflect operational needs, a boundary adjustment to accommodate a recent condemnation proceeding from PCWA, and other former actions requiring map updates. Additional changes submitted as part of PG&E's proposed project include changes to the project boundary consistent with the Commission-approved Roads and Trails Study Plan and the correction of boundary discrepancies identified through the use of aerial maps and field observations.

PG&E met with resource agencies and others to develop a comprehensive list of primary project roads. PG&E defines primary project roads as non-general-use roads used primarily for the project and are located within the project boundary. PG&E proposes modifications to the project boundary to include portions (or the whole) of the following primary project roads:

- Carr-Lindsey Road, located partially on PG&E land, partially on Forest Service land, and partially on private land;
- Upper Lindsey Lake Road, located entirely on PG&E land;
- Lower Peak Road, located partially on PG&E land and partially on Forest Service land;
- Langs Crossing Spillway Road, located partially on private land and partially on PG&E land;
- Drum Canal/YB-28 Access Road, located entirely on PG&E land;
- Chicken Ladder Road, located partially on private land and partially on PG&E land;
- Burnt Point Road, located entirely on PG&E land;
- Drum Canal Access Road, located entirely on PG&E land;
- Pittman Spill Channel North Road, located partially on private land and partially on PG&E land;
- Pittman Spill Channel South Road, located entirely on PG&E land;
- Drum #3 Penstock Access Road, located entirely on PG&E land;
- Wheel House Road, located entirely on PG&E land;

- Access Road, located entirely on PG&E land;
- South Yuba Canal Access Road (project road identification number DS038), located entirely on private land;
- East Excelsior Point Road, located partially on Forest Service land and partially on private land;
- South Yuba Canal Access Road (project road identification number DS039), located entirely on Forest Service land;
- Dutch Flat Surge Tank Road, located partially on PG&E land, partially on Forest Service land, and partially on private land;
- Feeley Lake Road, located entirely on Forest Service land;
- Drum Butterfly Valve House Road, located entirely on PG&E land;
- Boot Road, located entirely on Forest Service land;
- Spaulding No. 3 Header Box Road, located entirely on PG&E land;
- Upper Access to YB-34 Road, located partially on PG&E land and partially on Forest Service land;
- Spillway Access Road, located entirely on Forest Service land;
- South Yuba Canal Access Road (project road identification number DS083), located partially on PG&E land and partially on Forest Service land; and
- Bear Valley Spill Road, (South Yuba Canal Access), located partially on PG&E land and partially on Forest Service land.

2.2.1.2 Deer Creek Project Split

PG&E proposes to split the current Drum-Spaulding Project into two new licensed projects: the 5.7-MW Deer Creek Project and the remaining Drum-Spaulding Project without the Deer Creek Project facilities. The proposed Deer Creek Project would include the existing Deer Creek Development (see section 2.1.1.1, *Deer Creek Development*), with the exception of the upper 1.57 miles of the South Yuba Canal, which would remain part of the proposed Drum-Spaulding Project. The Deer Creek Project would include 334.9 acres of land, including 27.2 acres of federal lands (21.6 acres of Forest Service land and 5.6 acres of BLM lands). The development would continue to operate in the same manner. Environmental measures associated with the project are listed in Appendix D, table D-2. The environmental analysis of continued operation of the Deer Creek Development is included in section 3 and the economic analysis of the Deer Creek Project is found in section 4.2. Staff recommended measures are discussed in section 5. PG&E has filed numerous management plans that apply to the entire Drum-Spaulding Project. These plans would have to be revised as they relate to each individual project.

2.2.1.3 Yuba-Bear Project

NID proposes to expand the existing Rollins Development through the addition of Rollins no. 2 powerhouse; add five new streamflow gages; and replace, upgrade, or install new recreation facilities. NID also proposes to adjust the project boundary.

Generation Facilities

NID's only proposed generation expansion to the Yuba-Bear Project is to construct a new powerhouse associated with the Rollins Development. NID explains that the new generating facility (Rollins no. 2 powerhouse) would more effectively capture the combined releases from Rollins reservoir. The existing powerhouse consists of one vertical axis, Francis turbine with a rated capacity of 12.15 MW at a head of 208 feet and maximum flow of 840 cfs. NID anticipates that the new powerhouse would be constructed entirely on NID-owned land adjacent to the existing powerhouse location in a laydown area just below the existing parking lot on the right bank of the river.⁹ NID indicates that the existing powerhouse would be unaltered and remain in full operation.

Streamflow Gages

NID proposes to add to the project five new streamflow gages for monitoring compliance with minimum flow releases. The new gages would be located on the downstream face of the diversion facilities at Texas, Clear, Fall, Trap, and Rucker Creeks. The gages would be named YB-317, YB-318, YB-319, YB-320, and YB-321, respectively. In addition, existing USGS gages 11414410 (Canyon Creek below French Lake), 11414500 (Canton Creek below Faucherie Lake), and 11414470 (Canyon Creek below Sawmill Lake), which are currently rated to measure up to 3 cfs, would be improved to monitor compliance with NID's proposed minimum streamflows. Existing USGS gage 11421790 (Bear River below Dutch Flat afterbay dam) would be improved for rating.

Primary Project Access Roads

NID proposes to remove a segment of Chicago Park Forebay Road from the set of primary project access roads. This road segment is presently closed by an active landslide. NID also proposes to remove the unnamed recreation road that provides access to the Jackson Meadows administrative site. NID has never used this site nor has it used the recreation road that provides access to it and does not plan to use it in the future. NID proposes to decommission these roads as they are not necessary for continued project operation and maintenance (O&M).

⁹ The current design concept for the new powerhouse includes a 58-foot-by-40-foot concrete building that would house a single Francis turbine with a maximum flow of 600 cfs and synchronous generator combination yielding a maximum capacity of 11.4 MW. The average annual plant factor for the powerhouse, based on a model of plant operations from water year 1995 through 2008, is expected to be 0.55 (dependable capacity of 6.27 MW). The plant is expected to generate 18.4 GWh per year and to operate at 64 percent of capacity during dry years, at 83 percent of capacity during normal years, and at 96 percent of capacity during wet years. This new facility would be an automatic, remotely operable, unmanned installation. The upgrade would require modifications to the existing penstock to allow a new bifurcation to route flow to the new generation facility, and would include replacing the Rollins powerhouse switchyard with a new switchyard that will service both the existing and proposed powerhouses. The upgrade would occur entirely within the existing project boundary on NID-owned land.

Recreation Facilities

NID's proposed project includes a Recreation Facilities Plan. The plan contains many components, including replacement and upgrade of existing recreation facilities and evaluation for new recreation facilities over the term of the new license. The plan includes the addition of the following specific new facilities:

- **Jackson Meadows Reservoir:** install animal-resistant food lockers at campsites that do not have such lockers; construct a pedestrian, single-track trail from the first loop of East Meadow campground to Pass Creek; install a one-unit vault restroom at Pass Creek overflow campground; construct an accessible trail on the shoreline from the Pass Creek boat launch parking area to the shoreline at Aspen picnic area; construct a pedestrian, single-track trail from Aspen group campground to the parking area at Aspen picnic area; develop road access and a loading/unloading area at Woodcamp picnic area with accessible parking spaces and access to the shoreline restroom and picnic sites; construct pedestrian, single-track connector trails between the project recreation facilities within the Woodcamp Complex (Fir Top, Findley, Woodcamp and Silvertip group campgrounds and Woodcamp picnic area) and a connector trail from these connector trails to the non-project Woodcamp interpretive trailhead; replace the existing Woodcamp boat launch facility to California Department of Boating and Waterways standards.
- **Milton Diversion Impoundment:** develop a shoreline day-use area including a gravel parking area for up to five vehicles with barriers and a single-lane hand launch designed to accessible standards; develop up to six rustic campsites, each with a designated parking spur/space setback from the shoreline, steel fire ring, and site marker.
- **Bowman Lake:** develop a day-use parking area for up to 10 vehicles on NID land with vehicle barriers and an informational board (2-panel) at Jackson Creek inflow along the north shoreline/Bowman Lake Road; designate up to 10 primitive campsites along the shoreline on NID land each with a picnic table, steel fire ring, animal-resistant food locker, parking spur/space with barriers, site marker, and resource protection signage.
- **Sawmill Lake:** develop a rustic, 10-unit family campground on NID land with a native surface circulation road, 2-unit vault restroom, entrance station, and campsites each with a table, fire ring, animal-resistant food locker, site marker, and vehicle spur with barriers; develop a rustic group campground on NFS land to accessible standards, as feasible, consisting of a single group campsite for 25 PAOT, native surface parking area for 10 vehicles with barriers, 1-unit vault restroom, and hand launch.
- **Canyon Creek:** install animal-resistant food lockers at campsites without animal-resistant lockers.
- **Dutch Flat no. 2 Forebay:** install an information kiosk.
- **Dutch Flat Afterbay:** if suitable land can be identified along the shoreline, develop a day-use area that may include such facilities as gravel parking, picnic tables, restroom, and shoreline access trails.

Project Boundary

NID proposes the following changes to the existing project boundary:

- Use of contours derived from the USGS National Elevation Dataset 1/3 arc second digital elevation model as a partial replacement to survey metes and bounds that are used in the existing license to define the project boundary around Jackson Meadows reservoir, Bowman reservoir, French Lake, Jackson Lake, Sawmill Lake, Faucherie Lake, Dutch Flat forebay, and Dutch Flat afterbay. Where the derived contour lines exceeded 200 horizontal feet from a project reservoir's normal maximum water surface, 200-foot horizontal buffers of the reservoir's maximum water surface were used to define the project boundary.
- Removal of the area that incorporates the mineral survey area south of Dutch Flat afterbay.
- Removal of the area that incorporates the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it.
- Modification of the boundary to more accurately contain and encompass the following recreation sites: East Meadow campground, Fir Top campground, Bowman Lake campground, and Canyon Creek area campground.
- Addition of the area that incorporates the primary project portion of the following, including a right-of-way of 20 feet on-road centerline: French Lake Dam Road (Forest Service Road 843-20), Milton Pipeline Access Road, Wilson Creek Diversion Access Road, Bunkhouse Road, Texas Creek Diversion Access Road, Bowman-Spaulding Canal Berm Road, Bowman-Spaulding Canal Access Road, Stump Canyon Siphon Intake Access Road, Canyon Siphon Low Level Valve Access Road, "B" Alarm Road, Chicago Park Forebay Road, and Chicago Park Powerhouse Access Road.

All but two of the proposed project recreation facilities would be located within the proposed project boundary. These two facilities include: (1) the primitive campsites at the "Tree Camp" located along the north shoreline of Bowman Lake on Forest Service land; and (2) the walk-in campground at Sawmill Lake on NID land. Given the uncertainty of the final footprint for these two facilities, NID requests that the Commission expand the project boundary to include each facility after the final design of the facility is complete and prior to construction.

2.2.2 Proposed Project Operation

2.2.2.1 Drum-Spaulding Project

Future operation of existing project structures would be generally consistent with existing operation. Significant changes in future operation, however, are related to new and increased minimum flow releases, and modified ramping rates, as described in section 2.2.3.1, *Proposed Environmental Measures* (Measure DS-AQR1). PG&E also proposes the following: (1) re-operation between PG&E's Dutch Flat no. 1 and NID's Dutch Flat no. 2 powerhouses based on water rights rather than operational or efficiency considerations; and (2) use of modified winter/spring operations implemented since 1997.

2.2.2.2 Yuba-Bear Project

Future operation of existing project structures would be generally consistent with existing operation. Significant changes in future operation, however, are related to new and increased minimum flow releases and modified ramping rates, as described in section 2.2.3.2, *Proposed Environmental Measures* (Measure YB-AQR1). NID also proposes the following: (1) re-operation between PG&E's Dutch Flat no. 1 and NID's Dutch Flat no. 2 powerhouses based on water rights rather than operational or efficiency considerations; and (2) use of modified winter/spring operations implemented since 1997.

2.2.3 Proposed Environmental Measures

2.2.3.1 Drum-Spaulding Project

PG&E proposes the following protection and enhancement measures:

General Measures

- Consult annually with the Forest Service, BLM, and Reclamation to review operations and monitoring data from the prior year and conduct planning for ongoing project operations (Measure DS-GEN1).
- Conduct annual employee training to familiarize staff with special status species, noxious weeds, and sensitive areas known to occur within the project boundary on Forest Service, BLM, or Reclamation land, and the procedures for reporting to each agency (Measure DS-GEN2).
- Implement a Coordinated Operations Plan for the Drum-Spaulding Project and the Yuba-Bear Project regarding implementation of flow-related measures in each project's license (Measure DS-GEN3).

Geology and Soils

- Implement an Erosion Control and Slope Maintenance Plan to minimize and control project-related erosion; the plan would provide for project-wide implementation of best management practices (BMPs) to control erosion and sedimentation and more specifically include an inventory and prioritization of erosion sites on steep slopes below open project canals and spill structures and implementation of repair and restoration plans, as necessary.
- During winter to minimize potential adverse effects of high flows on channel morphology, bank stability, and aquatic and riparian habitat of the Bear River: limit operational flow releases from the Drum canal; implement ramping rates; and limit water spilled from the Drum canal to the upper Bear River through Bear Valley Meadow when the Drum afterbay is forecast to spill and the Dutch Flat no. 1 and no. 2 powerhouses are fully loaded.
- During facility outages that last more than 30 days: operate multiple spill gates from the Drum canal to more evenly distribute flows through Bear Valley Meadow; implement a 2-day ramping rate; and notify the appropriate agencies.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98 (Measure DS-AQR1, Part 1).
- To enhance aquatic habitat and protect resident aquatic species, provide the same or increased minimum streamflows to eight project-affected reaches and provide new minimum streamflows to five project-affected reaches, as described in section 3.3.2.2.1, Water Quantity, and shown in the tables of appendix A-2 as listed below (Measure DS-AQR1, Part 2).

Project-Affected Reach	Table No. in Appendix A-2
Fordyce Creek – below Fordyce Lake dam	3-115
South Yuba River – below Kidd Lake dam and Lower Peak Lake dam	3-120
South Yuba River – below Lake Spaulding dam	3-121
North Fork of the North Fork American River – below Lake Valley Reservoir dam	3-126
North Fork of the North Fork American River – below Lake Valley canal diversion dam	3-129
Bear River – at Highway 20 crossing	3-133
Bear River – below Drum afterbay	3-140
Dry Creek – below Halsey afterbay dam	3-142
Rock creek – below Rock Creek diversion dam	3-143
Mormon Ravine	3-146
South Fork Deer Creek – below Deer Creek powerhouse	3-125
Canyon Creek – below Towle canal diversion dam	3-136
Little Bear River – below Alta powerhouse tailrace	3-139

- Periodically set the low-level outlet at 16 remote project dams to provide the same or increased minimum streamflows in nine project reaches and new minimum streamflows in seven project-affected reaches, as described in section 3.3.2.2.1, Water Quantity, and shown in the tables of appendix A-2 as listed below (Measure DS-AQR1, Part 3).

Project-Affected Reach	Table No. in Appendix A-2
Texas Creek – below Upper Rock Lake dam	3-102
Texas Creek – below Lower Rock Lake dam	3-103
Unnamed tributary – below Culbertson Lake dam	3-104
Lindsey Creek – below Middle Lindsey Lake dam	3-105
Lindsey Creek – below Lower Lindsey Lake dam	3-106
Lake Creek – below Feeley Lake dam	3-107
Lake Creek – below Carr Lake dam	3-108
Rucker Creek – below Blue Lake dam	3-109

Project-Affected Reach	Table No. in Appendix A-2
Rucker Lake – below Rucker Lake dam	3-110
Unnamed tributary – below Fuller Lake dam	3-111
Unnamed tributary – below Meadow Lake dam	3-112
White Rock Creek – below White Rock diversion dam	3-113
Bloody Creek – below Lake Sterling dam	3-114
Unnamed tributary – below Kidd Lake dam	3-118
Cascade Creek – below Lower Peak Lake dam	3-119
Sixmile Creek – below Kelly Lake dam	3-128

- Notify licensing participants at the annual consultation meeting of all annual planned and non-routine planned canal outages. Implement modified minimum streamflows in project canal-affected stream reaches during the first 30 days of canal outages, as shown in appendix A-2, table 3-181 of the draft EIS. For canal outages anticipated to extend past 30 days, consult with agencies and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage. Drum and Bear River canals would not be taken out of service at the same time (Measure DS-AQR1, Part 4).
- Coordinate operations with the Yuba-Bear Project at Rollins dam and Bear River canal diversion dam to ensure maintenance of minimum streamflows downstream in the lower Bear River.
- To expand recreational whitewater boating opportunities and support Supplemental Flow releases downstream from Lake Spaulding to the South Yuba River, draw down Fordyce Lake beginning in late spring with an initially high target flow (250 to 450 cfs) until the lake reaches 29,000 acre-feet of remaining storage and then make equally apportioned releases throughout the rest of the year to reach an end-of-year storage of 7,500 to 10,000 acre-feet (Measure DS-AQR1, Part 5).
- Construct and operate two 1-cfs flow release devices near the existing spillway at the Drum canal to provide controllable minimum streamflows to the Bear River upstream of Drum afterbay (Measure DS-AQR1, Part 6).
- To reduce the risk of stranding of aquatic resources below Lake Spaulding dam, adhere to Lake Spaulding spill cessation schedules and minimize flow fluctuations in South Yuba River below Lake Spaulding, as shown in appendix A-2, table 3-182 and table 3-183 (Measure DS-AQR1, Part 7).
- Implement the Fish Protection and Management during Canal Outages Plan to minimize fish losses when canals are drained for maintenance and repair (Measure DS-AQR2).

- Pay up to a maximum of \$15,000 per year to the California Department of Fish and Wildlife (California Fish and Wildlife) for fish stocking in Lake Spaulding to support recreational angling, provided such stocking is performed (Measure DS-AQR3).
- Design and install specified new or modify existing streamflow gages to measure new minimum streamflows, as shown in appendix A-2, table 3-188 (Measure DS-AQR4).
- Provide minimum streamflows and canal outage minimum flows in Auburn Ravine below Wise and Wise No. 2 Developments and South canal release point, as shown in appendix A-2, table 3-144, of the draft EIS to protect and enhance resident aquatic resources and their habitat (Measure DS-AQR5).
- Set the low-level outlet at 16 remote project dams on a periodic schedule to comply with proposed minimum streamflows.
- Implement Aquatic Monitoring Plan to assess the effects of the proposed flow modifications on aquatic resources in selected project-affected stream reaches, to include monitoring fish, foothill yellow-legged frog, and observation of western pond turtle and non-native invasive species in larger stream reaches where new streamflow conditions would likely have the greatest effect on aquatic habitat, and water.
- Implement the Aquatic Invasive Species Prevention Guidelines within the proposed Integrated Vegetation Management Plan to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement an Integrated Vegetation Management Plan that combines all measures related to the management of terrestrial vegetation in the vicinity of project facilities and recreation sites and to control the spread of non-native invasive species (Measure DS-TR1).
- Monitor animal losses from drowning in project canals (Measure DS-TR2).
- Consult with California Fish and Wildlife, the Forest Service, and BLM when replacing wildlife escape and wildlife crossing facilities (Measure DS-TR3).
- Implement measures to protect the channel morphology and riparian vegetation of Bear River upstream of Forest Service lands, to include modifications to Drum canal winter operations and outage spills, and assessment of baseline conditions in Bear Valley meadow (Measure DS-TR4).
- Implement a Bald Eagle Management Plan to protect eagle nesting from disturbance during project operations and maintenance, and recreation activities (Measure DS-TR5).

Threatened and Endangered Species

- Implement VELB conservation measures to avoid or minimize the loss of elderberry shrubs.

Recreation Resources

- Implement the Recreation Plan for upgrades, maintenance, and development of new project recreation facilities on federal lands (Measure DS-RR1).
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet from May 1 through November 30 for: South Yuba River at Cisco (above Lake Spaulding); Fordyce Creek (below Fordyce Lake); South Yuba River (below Lake Spaulding dam); Bear River (at Highway 20); and Bear River (below Drum afterbay) (Measure DS-RR2).

Cultural Resources

- Implement an Historic Properties Management Plan (HPMP) to protect resources eligible for inclusion in the National Register of Historic Places (Measure DS-CR1).

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan to ensure that project roads are adequately maintained (Measure DS-LU1).
- Implement a Fire Prevention and Response Plan on federal project lands to provide fire prevention procedures, reporting, and safe fire practices for PG&E personnel and contractors responsible for operating and maintaining the project (Measure DS-LU2).
- Implement a Visual Resource Management Plan on federal lands to protect visual and aesthetic resources on and adjacent to project lands (Measure DS-AER1).
- Revise the project boundary to remove the Jordan Creek diversion and conveyance system and to include certain primary project roads, and new and rehabilitated recreation facilities after the facilities are decommissioned.

2.2.3.2 Yuba-Bear Project

NID proposes the following protection and enhancement measures:

General Measures

- Consult annually with the Forest Service and BLM to review operations and monitoring data from the prior year and conduct planning for ongoing project operations (Measure YB-GEN1).
- Conduct annual employee training to familiarize project staff with special status species, non-native invasive plants, and sensitive areas known to occur within the project boundary on Forest Service or BLM land, and the procedures for reporting to each agency (Measure YB-GEN2).
- Annually review special status species lists and assess potential impacts to newly listed species on federal project lands (Measure YB-GEN3).

- Consult with the Forest Service, BLM, or, as appropriate, California Fish and Wildlife, to determine potential project-related effects of any proposed future ground-disturbing activity on federal project land (Measure YB-GEN4).
- Prepare and submit a biological evaluation examining the potential impacts to special status species or their critical habitats from the construction of new project features on Forest Service or BLM land, and consult with California Fish and Wildlife, as appropriate (Measure YB-GEN5).
- Develop and implement of coordinated operations plan for Yuba-Bear Project and Drum-Spaulding Project regarding implementation of flow-related measures in each project's license (Measure YB-GEN6).
- Obtain prior written approval of the Forest Service or BLM, as appropriate, for the use of pesticides or herbicides on or affecting public land (Measure YB-GEN7).

Geology and Soils

- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during the Rollins upgrade construction (Measure YB-G&S1).
- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during recreation facility construction (Measure YB-G&S2).
- Implement a Clear and Trap Creeks Channel Stabilization Plan to stabilize existing erosion effects from spills in two stream channels and one spill channel directly downstream of the Bowman-Spaulding canal (Measure YB-G&S3).
- Implement an Erosion Control and Slope Maintenance Plan to identify the means to inventory, record, treat, and monitor potentially significant project-related erosion and sedimentation impacts to federal lands and minimize future erosion and sedimentation.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98 (Measure YB-AQR1, Part 1).
- To enhance aquatic habitat and support and protect resident aquatic species, provide the same or increased minimum streamflows to six project-affected reaches and provide new minimum streamflows to eight project-affected reaches, as described in section 3.3.2.2.1, Water Quantity, and shown in the tables of appendix A-2 as listed below (Measure YB-AQR1, Part 2).

Project-Affected Reach	Table No. in Appendix A-2
Middle Yuba River – below Jackson Meadows dam	3-149

Project-Affected Reach	Table No. in Appendix A-2
Middle Yuba River – below Milton diversion dam	3-151
Wilson Creek – below Wilson Creek diversion dam	3-155
Jackson Creek – below Jackson dam	3-156
Canyon Creek – below French dam	3-157
Canyon Creek – below Faucherie dam	3-159
Canyon Creek - below Sawmill dam	3-161
Canyon Creek – below Bowman-Spaulding diversion dam	3-163
Texas Creek – below Texas Creek diversion dam	3-167
Clear Creek – below Bowman-Spaulding diversion conduit	3-168
Trap Creek – below Bowman-Spaulding diversion conduit	3-173
Rucker Creek – below Bowman-Spaulding diversion conduit	3-174
Bear River – below Dutch Flat afterbay dam	3-175
Bear River – below Rollins dam	3-178

- Notify licensing stakeholders at the annual consultation meeting of all annual planned and non-routine planned canal outages in the Bowman-Spaulding diversion conduit. Provide minimum streamflow or inflow, whichever is less during canal outages in Bowman-Spaulding conduit and Drum-Spaulding Project's Drum canal. Consult with licensing stakeholders if the outage is anticipated to extend past 30 days and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage Measure YB-AQR1, Part 3).
- Implement overwintering minimum streamflow adjustments below Milton diversion dam and Bowman-Spaulding diversion dam in response to extended period of low regional precipitation, as described in section 3.3.2.2.1, *Water Quantity* (Measure YB-AQR1, Part 4).
- Measure streamflows at specified locations for documenting compliance with the proposed minimum streamflow requirements listed above and described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, table 3-189 (Measure YB-AQR9).
- Implement the periodic minimum streamflow settings due to remote location and access difficulties at Wilson Creek diversion dam, as described in section 3.3.2.2.1, *Water Quantity* (Measure YB-AQR1, Part 5).
- From May 1 through September 15, avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park powerhouse in a synchronous condense mode when the unit is not generating electricity. During non-routine planned outages that would cause

Dutch Flat afterbay dam to spill to the downstream Bear River, make a good faith effort to motor the Chicago Park powerhouse until the increased flows from the Dutch Flat afterbay dam reach the tailrace of Chicago Park powerhouse to prevent a sharp decrease in flows in the Bear River downstream of the Chicago Park powerhouse (Measure YB-AQR1, Part 6).

- To reduce the risk of stranding of aquatic resources implement spill cessation schedules and minimize flow fluctuations at Milton and Bowman-Spaulding diversion dams and Dutch Flat afterbay dam, as described in section 3.3.2.2.1, Water Quantity, as shown in appendix A-2, tables 3-184, 3-185, 3-186, and 3-187 (Measure YB-AQR1, Part 7).
- To prevent rapid flow fluctuations in the lower Bear River below Rollins dam, balance inflow from upstream with outflows when the Rollins reservoir water surface elevation is within the top 2 to 3 feet of the reservoir (Measure YB-AQR1, Part 8).
- Implement minimum streamflows for the Fall Creek diversion dam, as described in section 3.3.2.2.1, Water Quantity, as shown in appendix A-2, table 3-170 (Measure YB-AQR8).
- Implement a Canal Fish Rescue Plan to minimize fish losses when canals are drained for maintenance and repair (Measure YB-AQR5).
- Monitor numbers of fish entrained into the Milton-Bowman conduit weekly from April 15 through August 15 and provide a report evaluating effects of entrainment to the Forest Service, California Fish and Wildlife, and the California State Water Resources Control Board (California Water Board) for review and approval (Measure YB-AQR6).
- Annually in October, relocate the LWD that has accumulated on the upstream side of Rollins dam spillway log boom to the downstream side of the log boom. Allow the LWD between the log boom and spillway to pass over the spillway when the reservoir spills to enhance aquatic habitat in the Bear River below Rollins dam (Measure YB-AQR7).
- Implement an Aquatic Monitoring Plan to assess the effects of proposed flow modifications on aquatic resources in selected project-affected stream reaches.
- Implement aquatic invasive species management measures to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement a Non-Native Invasive Plant Management Plan to manage invasive weeds on federal lands within the project boundary through prevention, surveys, management, and reporting (Measure YB-TR1).
- Implement a Vegetation Management Plan on federal project lands to restore native vegetation in areas disturbed by project operation and maintenance through revegetation (Measure YB-TR2).
- Record annually all incidental observations of bird collisions/electrocutions at the Bowman-Spaulding transmission line. Consult with the Forest Service, U.S. Fish and Wildlife Service, and California Fish and Wildlife concerning measures needed to ensure the protection of birds where incidental observations of bird collisions/electrocutions illustrate a problem pole

or transmission structure. Replace or retrofit poles with substantial raptor-project interaction issues (Measure YB-TR3).

- Consult with the Forest Service or BLM, as appropriate, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals, and consult with California Fish and Wildlife regarding specifications and design. Assess existing wildlife escape facilities annually to ensure they are functional and in proper working order (Measure YB-TR4).
- Record animal losses from drowning in all project canals. Provide this information to California Fish and Wildlife, the Forest Service, or BLM, as appropriate, as well as to the Commission. In consultation with the appropriate resource agencies, develop additional measures to address suspected project-related causes of mortality if there is an increasing trend in wildlife mortalities in a canal (Measure YB-TR5).
- Document all known bat roosts within project buildings, dams, or other structures. Provide inspection results to California Fish and Wildlife, the Forest Service, and BLM, as appropriate. If bats or signs of roosting are present where project personnel routinely work, place humane exclusion devices to prevent occupation of the structure by bats (Measure YB-TR6).
- Implement a Bald Eagle Management Plan to protect nesting bald eagles from disturbance during project operations and recreational activities (Measure YB-TR7)
- Monitor the foothill yellow-legged frog population in Steephollow Creek from the confluence with the Bear River for a distance of 1,000 meters (1,094 yards) upstream, to assess if spills from the Chicago Park conduit result in adverse effects on the foothill yellow-legged frog population in Steephollow Creek and, if necessary, to facilitate the development of mitigation measures (Measure YB-AQR4).
- Conduct event-based monitoring of foothill yellow-legged frog populations in Steephollow Creek beginning the second full calendar year after a spill event and repeat in the third year following that spill event, and submit a monitoring report to BLM, California Fish and Wildlife, and the California Water Board.

Recreation Resources

- Implement a Recreation Plan for upgrades, maintenance, and development of new project recreation facilities on federal lands (Measure YB-RR1).
- Pay California Fish and Wildlife annually for the stocking of up to 20,000 trout fry and 25,000 kokanee fry in Bowman Lake and the stocking of up to 10,000 catchable rainbow trout, 10,000 catchable brown trout, and 25,000 kokanee fry in Rollins reservoir (Measures YB-AQR2 and YB-AQR3).
- Make mean daily streamflow information related to recreation boating opportunities available to the public via the internet from May 1 through November 30 for: Jackson Meadows reservoir; French Lake; Faucherie Lake; Sawmill Lake; Jackson Lake; Bowman Lake; Rollins Lake; Middle Yuba River below Milton diversion dam; Canyon Creek below Bowman dam; and Bear River below Rollins dam (Measure YB-RR2).

- Provide supplemental flows (target streamflow of between 120 and 150 cfs over a continuous 24 hour period as measured at gage YB-306) in Canyon Creek below French dam for whitewater boating starting between September 1 and September 30 of each year, until the date that French Lake elevation reaches 6,638 feet msl (Measure YB-RR3).
- Provide recreational streamflow events (continuous mean daily target streamflow of 300 cfs for at least 6 continuous days as measured at USGS gage 11408550 [Middle Yuba River below Milton diversion dam]) in any years in which spill at Milton diversion dam is 300 cfs or greater after May 1 (Measure YB-RR4).
- Provide recreational streamflow events (continuous mean daily target streamflow of 275 cfs for at least 5 continuous days as measured at gage 11416500 [Canyon Creek downstream of the Bowman-Spaulding diversion dam] after April 1) in any years in which flow as measured at USGS gage 11416500 is 275 cfs or greater (Measure YB-RR5).

Cultural Resources

- Implement an HPMP to ensure protection of cultural resources and resources that are eligible for inclusion in the National Register of Historic Places (Measure YB-CR1).

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan to rehabilitate and maintain primary project roads to ensure that project roads are adequately maintained (Measure YB-LU1).
- Implement a Fire Prevention and Response Plan to provide fire prevention procedures, reporting, and safe fire practices for NID personnel and contractors responsible for operating and maintaining the project (Measure YB-LU2).
- Revise the project boundary to remove the mineral survey area south of the Dutch Flat afterbay and the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it and to include certain primary project roads, and new and rehabilitated recreation facilities.
- Develop and implement a hazardous materials spill prevention, control, and countermeasure plan for the Rollins upgrade construction (Measure YB-WR1).
- Develop and implement a recreation facilities construction hazardous materials spill prevention, control and countermeasure plan (Measure YB-WR2).
- Implement a Visual Resource Management Plan on federal lands to improve the visual quality of the project by reducing the visual contrast of existing and proposed project facilities (Measure YB-AER1).

2.2.4 Modifications to Applicants' Proposals—Mandatory Conditions

The following mandatory conditions have been provided by the Forest Service, BLM, and Reclamation under section 4(e) and are evaluated in this EIS.

2.2.4.1 Drum-Spaulding Project

Forest Service

On July 31, 2012, the Forest Service filed terms and conditions pursuant to section 4(e) of the FPA, including 28 standard Forest Service conditions and 22 project-specific resource protection conditions. On August 23, 2012, the Forest Service filed revised conditions that included 27 standard Forest Service conditions and 19 project-specific resource protection conditions (appendix H-1).

Of the Forest Service's 46 revised conditions, we consider the 27 standard conditions (conditions 1 through 27) and conditions 32 and 46 to be administrative or legal in nature and not specific environmental measures. We do not analyze these administrative or legal conditions in this EIS with the exception of condition 1, *Consultation*; condition 12, *Protect Forest Service Special Status Species*; condition 16, *Pesticide Use Restrictions on NFS Lands*; condition 23, *Hazardous Substances Plan*; condition 26, *Slope Assessment and Facility Release Access Plan*; and condition 27, *Erosion and Sediment Control and Management*. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.1.4.2, *Land Management 4(e) Conditions*. The Forest Service conditions that we analyze in this document include:

- Forest Service condition 1: Consult with the Forest Service annually on measures needed to ensure protection and utilization of the National Forest resources affected by the project.
- Forest Service condition 12: Prepare and submit a biological evaluation to the Forest Service before taking action to construct new project features that may affect Forest Service special status species or their critical habitats.
- Forest Service condition 16: Obtain prior written approval from the Forest Service for use of pesticides on NFS lands or in areas affecting NFS lands. Pesticide use would be excluded from NFS lands within 500 feet of known locations of western pond turtles, Sierra Nevada yellow-legged frog, foothill yellow-legged frog, or known locations of Forest Service special status or culturally significant plant populations.
- Forest Service condition 23: File with the Commission a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup.
- Forest Service condition 26: Within 1 year after license issuance, file with the Commission a Slope Assessment and Facility Release Access Plan developed in consultation with the Forest Service, BLM, California Fish and Wildlife, and California State Water Board and approved by the Forest Service.
- Forest Service condition 27: Within 1 year of license issuance, file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with the Forest Service and other interested parties, and approved by the Forest Service.
- Forest Service condition 28, part 1: Annually perform employee awareness training and perform such training when a staff member is first assigned to the project.
- Forest Service condition 28, part 2: Within 90 days after issuance of new licenses for the Yuba-Bear Project or Drum-Spaulding Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan developed in consultation with the licensee for the Yuba-Bear Project, which shall provide coordination between the Yuba-Bear Project and

Drum-Spaulling Project regarding implementation of flow-related measures in each project's license.

- Forest Service condition 29, Water Year Type: Determine the water type year for minimum streamflow compliance based on the California DWR (Bulletin 120) Forecast of Total Unimpaired Runoff in the Yuba River at Smartville or California DWR Full Natural Flow Near Smartville for the Water Year, as shown in appendix H-1, table 1.
- Forest Service condition 29, Minimum Streamflows: Meet the minimum streamflows in specified reaches by month and water year type, as shown in appendix H-1, table 2. Minimum streamflow means the instantaneous flow except as otherwise provided. Record instantaneous streamflow as required by USGS standards at all gages.
- Forest Service condition 29, Flow Setting: By November 1 of each year, set the low-level outlet opening to set the flow release at the winter setting for each remote location, as shown in appendix H-1, table 3.
- Forest Service condition 29, Canal Outages: Inform annual consultation meeting participants about annual planned outages, non-routine planned outages, and emergency outages, as shown in appendix H-1, table 4.
- Forest Service condition 29, Fordyce Lake Drawdown: Manage flows released from Fordyce dam (measured at YB-200) after spills cease at both Fordyce dam and at Lake Spaulling, and Fordyce dam can be safely accessed.
- Forest Service condition 29, Spill Cessation and Minimization of Flow Fluctuations: Adhere to the Lake Spaulling spill cessation schedules, as shown in appendix H-1, tables 5 and 6. One spill cessation schedule is intended to address recreation interests in the project (including boating) and applies in wet, above normal, and below normal water years only, and does not apply in dry, critically dry, or extreme critically dry water years. The other spill cessation schedule applies in all water year types.
- Forest Service condition 29, South Yuba River Supplemental Flows: Release additional flow into the South Yuba River above the minimum streamflow annually between July 1 and September 15 in critically dry, dry, and below normal water years so that the total minimum streamflow (minimum streamflow plus supplemental flow) is no greater than 30 cfs, as shown in appendix H-1, table 7.
- Forest Service condition 29, Ecological Group: Establish an Ecological Group to assist in the implementation of project-wide monitoring plans and review and evaluation of monitoring data. The Ecological Group will also provide guidance on implementation of the South Yuba River Flow Adjustment Condition.
- Forest Service condition 30: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Canal Outages Fish Rescue Plan provided in the Final License Application and submit for Forest Service approval.
- Forest Service condition 31: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Gaging Plan provided in the Final License Application Amendment and submit for Forest Service approval.

- Forest Service condition 33: File with the Commission a plan approved by the Forest Service to address invasive species such as the New Zealand mudsnail, Quagga mussels, and zebra mussels if they are found during any monitoring. Implement aquatic invasive species prevention BMPs within the project boundary at project reservoirs.
- Forest Service condition 34, Vegetation and Non-Native Invasive Plant Management Plan: In consultation with the Forest Service, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, complete a single Vegetation and Non-Native Invasive Plant Management Plan for all NFS lands and BLM-administered lands potentially affected by the project.
- Forest Service condition 34, Monitor Animal Losses in Project Canals: Record animal losses in all project canals, and consult with the Forest Service, BLM, and California Fish and Wildlife and other interested parties during the annual meeting regarding the protection and utilization of the wildlife resources affected by the project.
- Forest Service condition 34, Replacement of Wildlife Escape and Wildlife Crossing Facilities: Consult with California Fish and Wildlife regarding specifications and design and with the Forest Service, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals. File the design with the Commission after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Assess existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order.
- Forest Service condition 34, Wildlife Crossings at Drum, South Yuba, and Towle Canals and Bear and South Canals: Complete a Wildlife Crossing Plan approved by the Forest Service, BLM, and California Fish and Wildlife for placing wildlife crossings across segments of conduits agreed to by the Forest Service, BLM, and California Fish and Wildlife; crossing structures shall maximize the continuity of native soils adjacent to and on the wildlife crossing.
- Forest Service condition 34, Bald Eagle Management Plan: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Bald Eagle Management Plan provided in the Final License Application Amendment, and submit for Forest Service approval.
- Forest Service condition 34, Special Status Species: Prepare and submit for Forest Service approval a biological evaluation that evaluates the potential impact of the action on the species or its habitat before taking actions to construct new project features on NFS lands that may affect Forest Service special status species or their critical habitats on NFS land.
- Forest Service condition 34, Annual Review of Special Status Species Lists: Annually review in consultation with the Forest Service the current lists of special status species that might occur on NFS lands, as appropriate, in the project area that may be directly affected by project operations.
- Forest Service condition 34, Project Powerlines: Use raptor-safe powerline design configurations described in Avian Protection on Powerline Interaction Committee's (APLIC) "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (APLIC, 2006), or the most current edition of this APLIC document, for all new powerlines

or when replacement of existing poles, phase conductors, and associated equipment is required.

- Forest Service condition 34, Raptor Collisions: Annually record all incidental observations of bird collisions/electrocutions at the Bowman-Spaulling Transmission Line including: date; location (i.e., nearest pole number); species, if identifiable; number of birds; condition of bird(s) (i.e., dead or injured); suspected cause of injury or death (i.e., electrocution or collision); and band number if the bird was banded.
- Forest Service condition 34, Bat Management: Document all known bat roosts within project buildings (e.g., powerhouses, storage buildings, and valve houses), dams, or other structures that may be used as a roosting structure and provided findings to California Fish and Wildlife and the Forest Service if the facility is located on NFS lands.
- Forest Service condition 34, Bear River Management Plan in Bear River above Drum afterbay: Develop a plan to assess riparian vegetation and bank stability conditions on NFS lands in Bear River above Drum afterbay at locations approved by the Forest Service. The plan shall include baseline monitoring, ongoing monitoring, and report and recommendations.
- Forest Service condition 35: Implement a monitoring program in coordination with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board. The monitoring program should include:
 - Aquatic monitoring that summarizes aquatic species monitoring data, information on survey effort and timing, maps of species distributions, quantitative descriptions of species distribution and relative abundance, and relationships of species distribution/abundance to streamflow and water temperature conditions, streamflow and water temperature, and other environmental and habitat data.
 - Non-native invasive species and sensitive plants monitoring described in the Integrated Vegetation and Non-Native Invasive Species Management Plan.
 - Monitoring associated with recreation as described in the Recreation measures.
 - Monitoring associated with cultural resources as described in the HPMP.
 - Monitoring associated with bear management as described in the Recreation measures.
 - Review of the location and design of Licensee-maintained crossings and natural landscape features that provide wildlife passage across the Licensee's conduits, in context with changes in land use patterns, human development, and road improvements or decommissioning that may affect wildlife use of crossings.
 - Record of the Licensee's activities that may generate noise disturbances that occur between February 15 through September 15 within 0.25 mile of California spotted owl and northern goshawk protected activity centers, and within suitable habitat for these species.
- Forest Service condition 36: Prepare a LWD management plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board and approved by the Forest Service.

- Forest Service condition 37: Conduct recreation survey and monitoring, occupancy surveys of project facilities on NFS land, and a Recreational User Survey (questionnaire) on NFS land; and prepare the Recreation Monitoring and Survey Report.
- Forest Service condition 38: Provide a contact for the Forest Service when planning or constructing recreation facilities or other project improvements and when routine and other maintenance activities are taking place on NFS lands.
- Forest Service condition 39: Review all project-related recreation facilities described in condition 41 and agree upon necessary maintenance, rehabilitation, construction, and reconstruction work needed and its timing. Develop a 6-year schedule for maintenance, rehabilitation, and reconstruction for approval by the Forest Service prior to being filed with the Commission.
- Forest Service condition 40: Meet with interested resource agencies for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure public safety and protection and utilization of recreation facilities.
- Forest Service condition 41, General Measures for all Recreation Sites: Finalize a Recreation Plan in consultation and coordination with the Forest Service, and submit for Forest Service approval. The Recreational Plan should address:
 - Camping in designated sites only at the following lakes: Fordyce, Rucker, Blue, Lower Lindsey, Carr, Meadow, Kelly, Kidd, Peak, and Lake Valley Lakes. Fuller will remain a “No Camping” lake.
 - On NFS lands, the standards for cleaning, operating, and maintaining recreation sites shall be consistent with current Forest Service standards and policies.
 - Ensure recreation facilities provide drinking water and manage new drinking water systems as public drinking water systems (i.e., serve at least 15 service connections or 25 persons).
 - Ensure vegetation management, including, but not limited to, hazard tree and branch removal, vegetative screening, brushing, or pruning occurs at project recreation facilities located on NFS lands.
 - Install metal animal-proof food storage lockers large enough (30-cubic feet) to hold a large cooler at all overnight campsites at all walk-in campgrounds.
 - Inspect all fire rings to ensure they are maintained in good condition or replaced; good condition includes a level grill with a usable grate.
 - Provide as-built drawing of all project facilities; the drawings should reflect current dimensions and layouts, including underground utilities.
 - Provide information about how the public can help prevent the spread of water-borne pathogens at all information kiosks and boat launches in the project.

- Provide signs addressing applicable lake surface regulations at all recreation sites that are located on project lakes and in compliance with land management agency management plans.
- Develop an information strategy, in coordination with the Forest Service that includes maps, information, brochures, signs, websites, etc.
- Provide at all newly constructed and reconstructed campgrounds on NFS lands a minimum of the following constructed features: roads and spurs with barriers to prevent off road travel; tables; fire rings; animal resistant food lockers; bulletin boards; entrance station and sign; toilets; site markers; leveled tent pads; and routes between site features.
- Meet the intent of the Forest Service accessibility direction with all new or rehabilitated/reconstructed project recreational areas and facilities on NFS lands.
- Forest Service condition 41, Heavy Maintenance: Be responsible for the cost of necessary maintenance, rehabilitation, and reconstruction for the project recreation facilities.
- Forest Service condition 41, General Reconstruction: Meet with the Forest Service prior to reconstruction of a recreation facility to review the design of the facility in light of changes in use and design standards since the facility was constructed. Specific Facilities:
 - Lake Spaulding Area: Construct a boat-in campground; retro-fit the existing accessible campsite at Spaulding Lake campground, or relocate the site, to meet current Americans with Disabilities Act Guidelines for Buildings and Facilities; reconstruct the day use/boat launch at Fuller Lake (Development Scale 3 Facilities); make additional improvements to Fuller Angler Access, Rucker Lake, and Blue Lake.
 - Grouse Lake Area: expand and reconstruct Carr Lake campground as a Development Scale 2 facility; make additional improvements to Lindsay Lake Area.
 - Fordyce Lake Area: convert Sterling Lake campground to a Development Scale 3 day use area; make additional improvement to the Sterling Lake dispersed campsites, Fordyce Lake off-highway vehicle (OHV) signage, Fordyce campground development.
 - White Rock and Meadow Lake Areas: make improvements to White Rock Lake, Meadow Lake, Meadow Knolls group campground, and Peak and Kidd Lakes; reconstruct the Meadow Shoreline campground; install information boards and post informational signs at Meadow campground.
 - Lake Valley Area: make improvements to Lodgepole campground, Silvertip picnic area and boat launch; develop a new Lake Valley group campground; construct a new campground at Lake Valley reservoir.
 - Bear Valley Group Camp and Sierra Discovery Trail: make improvements to Bear Valley group campground; repair or replace the existing trail boardwalk on Sierra Discovery Trail.
 - Bear River Corridor: make improvements to Bear River Trail Project.

- Forest Service condition 41, Recreation Plan Revision and Costs of Managing Project-Related Recreation: Revise the Recreation Plan when substantial changes occur and coordinate with the Forest Service to develop a plan to address the costs of managing the project-related recreation on NFS lands.
- Forest Service condition 42: In consultation with the Forest Service, finalize the Visual Resource Management Plan provided in the Final License Application, and submit for Forest Service approval.
- Forest Service condition 43, Implement HPMP: File with the Commission the HPMP that is approved by the Forest Service.
- Forest Service condition 43, Discovery of Cultural Resources during Ground-Disturbing Activities: If, prior to or during ground disturbance or as a result of project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on Forest Service lands or the Licensee's adjoining property, immediately cease work in the area so affected. Notify the Forest Service and not resume work on ground-disturbing activities until the written approval is received from the Forest Service.
- Forest Service condition 43, Recovery and Preservation of Cultural Resources: If deemed necessary by the Forest Service, perform recovery, excavation, and preservation of the site and its artifacts at the licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by the Forest Service.
- Forest Service condition 44: Consult with the Forest Service and other affected parties in the development of the Road and Transportation System Management Plan to be filed with the Commission and approved by the Forest Service, for protection and maintenance of project and project-affected roads that are on or affect NFS lands.
 - Improve project roads listed in poor condition to meet Forest Service standards.
 - Include facility recreation roads that are on or affect NFS lands in the Transportation System Management Plan.
 - Include maps, tables, a Traffic Safety and Signing Component, inventory of all illegally built user created routes, and any proposed changes to maintenance levels in the Transportation System Management Plan.
 - Develop and submit for Forest Service approval annual road an O&M schedule for project roads on NFS lands to comply with Forest Service standards, specifications, road management objectives, BMPs including all state requirements, and Travel Management guidelines.
- Forest Service condition 45: In consultation with the Forest Service, BLM, California Department of Forestry and Fire Protection, potentially affected Tribes, and other interested parties, complete a Fire and Fuels Management Plan approved by the Forest Service that details the Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations.

BLM

On July 31, 2012, BLM filed terms and conditions pursuant to section 4(e) of the FPA, including 24 standard BLM conditions and 22 project-specific resource protection conditions. On August 23, 2012, the BLM filed revised conditions that included 28 standard BLM conditions and 22 project-specific resource protection conditions (appendix H-2).

Of BLM's 50 revised conditions, we consider the 28 standard conditions (conditions 23 through 50) and condition 8 to be administrative or legal in nature and not specific environmental measures. These conditions were nearly identical to the Forest Service administrative conditions with the removal of one Forest Service condition (condition 26, *Slope Assessment and Facility Release Access Plan*) and the addition of two BLM general conditions (condition 46, *Maintenance of Improvements*, and condition 48, *Licensee Contact*). We do not analyze these administrative or legal conditions in this EIS, with the exception of condition 23, *Consultation*; condition 33, *Protect Bureau of Land Management Special Status Species*; condition 37, *Pesticide Use Restrictions on Bureau of Land Management Lands*; condition 48, *Licensee Contact*; condition 49, *Hazardous Substances Plan*; and condition 50, *Erosion and Sediment Control and Management*. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.1.4.2, *Land Management 4(e) Conditions*. The BLM conditions that we analyze in this document include:

- BLM condition 1: similar to Forest Service condition 28, Annual Employee Training.
- BLM condition 2: similar to Forest Service condition 28, Coordinated Operations Plan.
- BLM condition 3: The Licensee shall not divert water to the Bear River canal that is released from Rollins reservoir to meet the flow measures in the Bear River below the Rollins reservoir as measured at NID gage YB-196 (USGS 11422500).
- BLM condition 4: provide minimum streamflows similar to the flows specified in Forest Service condition 29, part 4 (see appendix H-2, table 4).
- BLM condition 5: similar to Forest Service condition 30.
- BLM condition 6: Enter into a Recreation O&M agreement to establish the process for constructing a vault toilet at Purdon Crossing; kiosk at Purdon and Edwards Crossing; an 8-foot wide path leading from the river to the trailhead or parking area of Edwards and Purdon Crossing; and replacing the vault toilet at Edwards Crossing. Begin providing annual funding for operation, maintenance, law enforcement patrolling, and administration.
- BLM condition 7: similar to Forest Service condition 29, Ecological Group.
- BLM condition 9: similar to Forest Service condition 31.
- BLM condition 10: similar to Forest Service condition 34, Wildlife Crossing and Bear River and Drum (Chalk Bluff) Canals.
- BLM condition 11: similar to Forest Service condition 34, Replacement of Wildlife Escape and Crossing Facilities.
- BLM condition 12: similar to Forest Service condition 34, Monitor Animal Losses in Project Canals.

- BLM condition 13: similar to Forest Service condition 34, Special Status Species.
- BLM condition 14: similar to Forest Service condition 34, Annual Review of Special Status Species Lists.
- BLM condition 15: similar to Forest Service condition 34, Project Powerlines and Raptor Collisions.
- BLM condition 16: similar to Forest Service condition 34, Bald Eagle Management Plan.
- BLM condition 17: similar to Forest Service condition 34, Terrestrial Protection Measures.
- BLM condition 18: similar to Forest Service condition 45.
- BLM condition 19: File with the Commission a plan developed in consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board and approved by BLM that includes: (1) assessment of landslide hazards for slopes above and below open sections of canal and other project facilities including slope stability analysis in locations that are considered moderately to highly unstable; (2) assessment of past canal breach areas to determine erosive condition of slopes below these areas; (3) conduct an assessment of penstock and other drainage structure emergency and maintenance release; and (4) include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations.
- BLM condition 20: similar to Forest Service condition 42.
- BLM condition 21: similar to Forest Service condition 43.
- BLM condition 22: similar to Forest Service condition 44.
- BLM condition 23: similar to Forest Service condition 1.
- BLM condition 33: similar to Forest Service condition 12.
- BLM condition 37: similar to Forest Service condition 16.
- BLM condition 48: similar to Forest Service condition 38.
- BLM condition 49: similar to Forest Service condition 23.
- BLM condition 50: similar to Forest Service condition 27.

Reclamation

On July 31, 2012, Reclamation filed terms and conditions pursuant to section 4(e) of the FPA, including 11 standard Reclamation conditions and 4 project-specific resource protection conditions (appendix H-3).

Of Reclamation's 15 conditions, we consider condition A and the 14 standard conditions (conditions b.1 through b.14) to be administrative or legal in nature and not specific environmental measures. Conditions b.1 to b.10 are nearly identical to the Forest Service and BLM administrative

conditions. We do not analyze these administrative or legal conditions in this EIS, with the exception of condition b.1, *Consultation*; condition b.9, *Pesticide Use Restrictions on Reclamation Lands*; condition b.10, *Hazardous Materials*; and condition b.11, *Discovery of Cultural Resources*. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.1.4.2, *Land Management 4(e) Conditions*. The Reclamation conditions that we analyze in this document are specific to the O&M of Newcastle Powerhouse and include:

- Reclamation condition b.1: similar to Forest Service condition 1 and BLM condition 23.
- Reclamation condition b.9: similar to Forest Service condition 16 and BLM condition 37.
- Reclamation condition b.10: similar to Forest Service condition 23 and BLM condition 49.
- Reclamation condition b.11: Immediately provide notification to the Reclamation authorized official in the event of discovery of any antiquities, paleontological items, or objects of archeological, cultural, historic, or scientific interest on Reclamation lands.

2.2.4.2 Yuba-Bear Project

On July 31, 2012, the Forest Service filed terms and conditions pursuant to section 4(e) of the FPA, including 28 standard Forest Service conditions and 22 project-specific resource protection conditions. On August 23, 2012, the Forest Service filed revised conditions that included 27 standard Forest Service conditions and 19 project-specific resource protection conditions (appendix I-1).

Of the Forest Service's 46 revised conditions, we consider the 27 standard conditions (conditions 1 through 27) and conditions 32 and 46 to be administrative or legal in nature and not specific environmental measures. We do not analyze these administrative or legal conditions in this EIS with the exception of condition 1, *Consultation*; condition 12, *Protect Forest Service Special Status Species*; condition 16, *Pesticide Use Restrictions on NFS Lands*; condition 23, *Hazardous Substances Plan*; condition 26, *Slope Assessment and Facility Release Access Plan*; and condition 27, *Erosion and Sediment Control and Management*. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.2.4.2, *Land Management 4(e) Conditions*. The Forest Service conditions that we analyze in this document include:

- Forest Service condition 1: Consult with the Forest Service annually on measures needed to ensure protection and utilization of the National Forest resources affected by the project.
- Forest Service condition 12: Prepare and submit a biological evaluation to the Forest Service before taking action to construct new project features that may affect Forest Service special status species or their critical habitats.
- Forest Service condition 16: Obtain prior written approval from the Forest Service for use of pesticides on NFS lands or in areas affecting NFS lands. Pesticide use would be excluded from NFS lands within 500 feet of known locations of western pond turtles, Sierra Nevada yellow-legged frog, foothill yellow-legged frog, or known locations of Forest Service special status or culturally significant plant populations.
- Forest Service condition 23: File with the Commission a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup.

- Forest Service condition 26: Within 1 year after license issuance, file with the Commission a Slope Assessment and Facility Release Access Plan developed in consultation with the Forest Service, BLM, California Fish and Wildlife, and California Water Board and approved by the Forest Service.
- Forest Service condition 27: Within 1 year of license issuance, file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with the Forest Service and other interested parties, and approved by the Forest Service.
- Forest Service condition 28, Annual Employee Training: Annually perform employee awareness training and perform such training when a staff member is first assigned to the project.
- Forest Service condition 28, Coordinated Operations Plan: Within 90 days after issuance of new licenses for the Yuba-Bear Project or Drum-Spaulling Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan developed in consultation with the licensee for the Drum-Spaulling Project, which shall provide coordination between the Yuba-Bear Project and Drum-Spaulling Project regarding implementation of flow-related measures in each project's license.
- Forest Service condition 29, Water Year Type: Determine the water type year for minimum streamflow compliance based on the California DWR (Bulletin 120) Forecast of Total Unimpaired Runoff in the Yuba River at Smartville or California DWR Full Natural Flow Near Smartville for the Water Year, as shown in appendix I-1, table 1.
- Forest Service condition 29, Minimum Streamflows: Meet the minimum streamflows in specified reaches by month and water year type, as shown in appendix I-1, table 2. Minimum streamflow means the instantaneous flow except as otherwise provided. Record instantaneous streamflow as required by USGS standards at all gages.
- Forest Service condition 29, Canal Outages: Inform annual consultation meeting participants about annual planned outages, non-routine planned outages, and emergency outages, as shown in appendix I-1, table 3.
- Forest Service condition 29, Overwintering Streamflow Adjustments: Overwintering minimum streamflow adjustments:
 - Middle Yuba River Below Milton Diversion Dam: generally, minimum streamflow in the Middle Yuba River downstream of Milton diversion dam shall be 15 cfs.
 - Canyon Creek Below Bowman-Spaulling Diversion Dam: generally, minimum streamflow in the Canyon Creek downstream of Bowman-Spaulling diversion dam shall be 20 cfs.
- Forest Service condition 29, Wilson Creek Diversion Dam Flow Setting: compliance with the minimum streamflows described for Wilson Creek diversion dam:
 - Non-Winter Period: Set the outlet works once each week consistent with the minimum streamflow for that month.

- Winter Period: Set the outlet works at Wilson Creek diversion dam to make the minimum streamflow release for the Wilson Creek diversion dam.
- Forest Service condition 29, Spill Cessation and Minimization of Flow Fluctuations: Provide target flows, measured as mean daily flow, within 10 percent of the target flows with effort not to make releases from Milton diversion dam and Bowman-Spaulding diversion dam that result in short-term, high flow fluctuations. Adhere to the spill cessation schedule for the Middle Yuba River below Milton diversion dam and the Canyon Creek, as shown in appendix I-1, tables 4 and 5.
- Forest Service condition 29, Mitigation of Entrainment: Develop in consultation with the Forest Service, California Fish and Wildlife, and the California Water Board, a Fish Entrainment Protection Plan for a fish screen for rainbow trout fry at or near the Milton-Bowman diversion dam on the Middle Yuba River; after approval by the Forest Service, file with Commission for approval a plan that specifies the Licensee with construct and maintain a retractable cylindrical fish screen system to be installed in the Milton diversion impoundment in front of the existing Milton-Bowman conduit intake.
- Forest Service condition 29, Ecological Group: Establish an Ecological Group to assist in the implementation of project-wide monitoring plans and review and evaluation of monitoring data.
- Forest Service condition 30: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Canal Outages Fish Rescue Plan provided in the Final License Application and submit for Forest Service approval.
- Forest Service condition 31: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Gaging Plan provided in the Final License Application Amendment and submit for Forest Service approval.
- Forest Service condition 33: File with the Commission a plan approved by the Forest Service to address invasive species such as the New Zealand mudsnail, Quagga mussels, and zebra mussels if they are found during any monitoring. Implement aquatic invasive species prevention BMPs within the project boundary at project reservoirs.
- Forest Service condition 34, Vegetation and Non-Native Invasive Plant Management Plan: In consultation with the Forest Service, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, complete a single Vegetation and Non-Native Invasive Plant Management Plan for all NFS lands and BLM-administered lands potentially affected by the project.
- Forest Service condition 34, Monitor Animal Losses in Project Canals: Record animal losses in all project canals, and consult with the Forest Service, BLM, and California Fish and Wildlife and other interested parties during the annual meeting regarding the protection and utilization of the wildlife resources affected by the project.
- Forest Service condition 34, Replacement of Wildlife Escape and Wildlife Crossing Facilities: Consult with California Fish and Wildlife regarding specifications and design and with the Forest Service, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals. File the design with the Commission after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Assess

existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order.

- Forest Service condition 34, Wildlife Crossing and Bowman-Spaulding Canal: Maintain and construct wildlife crossings at Bowman-Spaulding canal.
- Forest Service condition 34, Bald Eagle Management Plan: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, finalize the Bald Eagle Management Plan provided in the Final License Application Amendment, and submit for Forest Service approval.
- Forest Service condition 34, Special Status Species: Prepare and submit for Forest Service approval a biological evaluation that evaluates the potential impact of the action on the species or its habitat before taking actions to construct new project features on NFS lands that may affect Forest Service special status species or their critical habitats on NFS land.
- Forest Service condition 34, Annual Review of Special Status Species List: Annually review in consultation with the Forest Service the current lists of special status species that might occur on NFS lands, as appropriate, in the project area that may be directly affected by project operations.
- Forest Service condition 34, Project Powerlines: Use raptor-safe powerline design configurations described in Avian Protection on Powerline Interaction Committee's (APLIC) "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (APLIC, 2006), or the most current edition of this APLIC document, for all new powerlines or when replacement of existing poles, phase conductors, and associated equipment is required.
- Forest Service condition 34, Raptor Collisions: Annually record all incidental observations of bird collisions/electrocutions at the Bowman-Spaulding Transmission Line including: date; location (i.e., nearest pole number); species, if identifiable; number of birds; condition of bird(s) (i.e., dead or injured); suspected cause of injury or death (i.e., electrocution or collision); and band number if the bird was banded.
- Forest Service condition 34, Bat Management: Document all known bat roosts within project buildings (e.g., powerhouses, storage buildings, and valve houses), dams, or other structures that may be used as a roosting structure and provided findings to California Fish and Wildlife and the Forest Service if the facility is located on NFS lands.
- Forest Service condition 34, Clear and Trap Creek Channel Stabilization Plan: Coordinate with the Forest Service to complete the stabilization plan for Clear and Trap Creeks that was included in the FLA. Implement the Clear and Trap Creeks Channel Stabilization Plan after Forest Service and Commission approval.
- Forest Service condition 35: Implement a monitoring program in coordination with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board. The monitoring program should include:
 - Aquatic monitoring that summarizes aquatic species monitoring data, information on survey effort and timing, maps of species distributions, quantitative descriptions of species' distribution and relative abundance, and relationships of species

distribution/abundance to streamflow and water temperature conditions, streamflow and water temperature, and other environmental and habitat data.

- Monitoring associated with recreation as described in the Recreation measures.
 - Monitoring associated with cultural resources will be described in the HPMP.
 - Monitoring associated with bear management as described in the Recreation measures.
 - Review the location and design of Licensee-maintained crossings and natural landscape features that provide wildlife passage across the Licensee's conduits, in context with changes in land use patterns, human development, and road improvements or decommissioning that may affect wildlife use of crossings.
- Forest Service condition 36: Prepare an LWD management plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board and approved by the Forest Service.
 - Forest Service condition 37: Conduct recreation survey and monitoring, occupancy surveys of project facilities on NFS land, a Recreational User Survey (questionnaire) on NFS land; and prepare the Recreation Monitoring and Survey Report.
 - Forest Service condition 38: Provide a contact for the Forest Service when planning or constructing recreation facilities or other project improvements and when routine and other maintenance activities are taking place on NFS lands.
 - Forest Service condition 39: Review all project-related recreation facilities described in condition 41 and agree upon necessary maintenance, rehabilitation, construction, and reconstruction work needed and its timing. Develop a 6-year schedule for maintenance, rehabilitation, and reconstruction for approval by the Forest Service prior to being filed with the Commission.
 - Forest Service condition 40: Meet with interested resource agencies for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure public safety and protection and utilization of recreation facilities.
 - Forest Service condition 41, General Measures for all Recreation Sites: Finalize a Recreation Plan in consultation and coordination with the Forest Service, and submit for Forest Service approval. The Recreational Plan should address:
 - On NFS lands, the standards for cleaning, operating, and maintaining recreation sites shall be consistent with current Forest Service standards and policies.
 - Ensure recreation facilities provide drinking water and manage new drinking water systems as public drinking water systems (i.e. serve at least 15 service connections or 25 persons)
 - Ensure vegetation management, including, but not limited to, hazard tree and branch removal, vegetative screening, brushing, or pruning occurs at project recreation facilities located on NFS lands.

- Install metal animal-proof food storage lockers large enough (30-cubic feet) to hold a large cooler at all overnight campsites at all walk-in campgrounds.
- Inspect all fire rings to ensure they are maintained in good condition or replaced; good condition includes a level grill with a usable grate.
- Provide as-built drawing of all project facilities; the drawings should reflect current dimensions and layouts, including underground utilities.
- Provide information about how the public can help prevent the spread of water-borne pathogens at all information kiosks and boat launches in the project.
- Provide signs addressing applicable lake surface regulations at all recreation sites that are located on project lakes and in compliance with land management agency management plans.
- Develop an information strategy, in coordination with the Forest Service, which includes maps, information, brochures, signs, websites, etc.
- Provide at all newly constructed and reconstructed campgrounds on NFS lands a minimum of the following constructed features: roads and spurs with barriers to prevent off road travel; tables; fire rings; animal resistant food lockers; bulletin boards; entrance station and sign; toilets; site markers; leveled tent pads; and routes between site features.
- Meet the intent of the Forest Service accessibility direction with all new or rehabilitated/reconstructed project recreational areas and facilities on NFS lands.
- Forest Service condition 41, Heavy Maintenance: Be responsible for the cost of necessary maintenance, rehabilitation, and reconstruction for the project recreation facilities.
- Forest Service condition 41, General Reconstruction: Meet with the Forest Service prior to reconstruction of a recreation facility to review the design of the facility in light of changes in use and design standards since the facility was constructed. Specific Facilities:
 - Jackson Meadows Reservoir Area:
 - Continue to limit camping to developed sites only around Jackson Meadows reservoir.
 - In consultation with the Forest Service, prepare a development plan for facility expansion assuring the optimum use of this land to meet future project induced recreation.
 - Conduct sanitary surveys of all septic tanks and disposal fields.
 - Construct group campground facilities with potable water to accommodate at least 50 PAOT.
 - Construct a minimum of 20 additional family campsites with potable water.

- All facilities in the Jackson Meadows complex, except Jackson Point boat-in campground, will be managed as Development Scale 4.
- Reconstruction and improvements to Aspen Group campground, Aspen picnic area, Pass Creek campground, Pass Creek boat ramp, Pass Creek overflow (aka Henness Pass campground), East Meadows campground, Firtop campground, Woodcamp campground, Woodcamp picnic area, Woodcamp boat ramp, Silvertip Group campground, Findley campground, Jackson Point boat-in campground, Jackson Vista Point, Jackson Meadows administrative site, Jackson sanitary sump station enhancement, Woodcamp interpretive trail, and additional trail construction.
- Milton Reservoir Area: improvements to campsites, outdoor recreational areas, and boat launch area.
- French Lake: grade and gravel the existing parking area, add trailhead sign.
- Bowman Reservoir Area: prepare a corridor-wide recreation development and management plan for the Bowman Recreation Corridor in consultation with the Forest Service including all land within 1,500 feet north of the project lake access roads from Bowman dam on the west, Jackson Creek campground on the east, and Faucherie dam on the south, and all land south of the access roads to incorporate Bowman, Sawmill and Faucherie reservoirs, Canyon Creek between Bowman and Faucherie, and 1,500 feet to the south of the reservoirs and creek.
 - Include improvements to Bowman reservoir, Sawmill reservoir, Faucherie Lake, Canyon Creek Area including campground and dispersed sites, Jackson Creek campground, Bowman Recreation Corridor Trail Development including Sawmill Trail, French Lake Trail, and Lang's Crossing
- Bear River Corridor: Bear River Trail Project—Cooperate with trail planners to determine the alignment of the trail across the Licensee's lands along Bear River, including project canals, and for trailheads on the Licensee's lands.
- Forest Service condition 41, Recreation Plan Revision and Cost of Managing Project-Related Recreation: Revise the Recreation Plan when substantial changes occur and coordinate with the Forest Service to develop a plan to address the costs of managing the project-related recreation on NFS lands.
- Forest Service condition 42: In consultation with the Forest Service, finalize the Visual Resource Management Plan provided in the Final License Application and submit for Forest Service approval.
- Forest Service condition 43, Implement an HPMP: File with the Commission the HPMP that is approved by the Forest Service.
- Forest Service condition 43, Discovery of Cultural Resources during Ground Disturbing Activities: If, prior to or during ground disturbance or as a result of project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on Forest Service lands or the Licensee's adjoining property, immediately cease work in the area so affected. Notify the

Forest Service and not resume work on ground-disturbing activities until written approval is received from the Forest Service.

- Forest Service condition 43, Recovery and Preservation of Cultural Resources: If deemed necessary by the Forest Service, perform recovery, excavation, and preservation of the site and its artifacts at the Licensee's expense through provisions of an Archeological Resources Protection Act permit issued by the Forest Service.
- Forest Service condition 44: Consult with the Forest Service and other affected parties in the development of the Road and Transportation System Management Plan to be filed with the Commission and approved by the Forest Service, for protection and maintenance of project and project-affected roads that are on or affect NFS lands.
 - Improve project roads listed in poor condition to meet Forest Service standards.
 - Include facility recreation roads that are on or affect NFS lands in the Transportation System Management Plan.
 - Include maps, tables, a Traffic Safety and Signing Component, inventory of all illegally built user created routes, and any proposed changes to maintenance levels in the Transportation System Management Plan.
 - Develop and submit for Forest Service approval annual road an O&M schedule for project roads on NFS lands to comply with Forest Service standards, specifications, road management objectives, BMPs including all state requirements, and Travel Management guidelines.
- Forest Service condition 45: In consultation with the Forest Service, BLM, California Department of Forestry and Fire Protection, potentially affected Tribes, and other interested parties, complete a Fire and Fuels Management Plan approved by the Forest Service that details the Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations.

BLM

On July 31, 2012, BLM filed terms and conditions pursuant to section 4(e) of the FPA, including 24 standard BLM conditions and 42 project-specific resource protection conditions. On August 27, 2012, the BLM filed revised conditions that included 25 standard BLM conditions and 41 project-specific resource protection conditions (appendix I-2).

Of BLM's 66 revised conditions, we consider the 25 standard conditions (conditions 42 through 66) and condition 14 to be administrative or legal in nature and not specific environmental measures. These conditions were nearly identical to the Forest Service administrative conditions with the removal of one Forest Service condition (condition 23, *Hazardous Substance Plan*) and the addition of one BLM general condition (condition 65, *Maintenance of Improvements*). We do not analyze these conditions in this EIS with the exception of BLM condition 42, *Consultation*; condition 52, *Protect Bureau of Land Management Special Status Species*; and condition 56, *Pesticide Use Restrictions on Bureau of Land Management Lands*. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.2.4.2, *Land Management 4(e) Conditions*. The BLM conditions that we analyze in this document specify that NID:

- BLM condition 1: similar to Forest Service condition 28, Annual Employee Training.
- BLM condition 2: similar to Forest Service condition 28, Coordinated Operations Plan.
- BLM condition 3: provide minimum streamflows based on water year type similar to Forest Service condition 29, Water Year Type (see appendix I-2, table 1).
- BLM condition 4: provide minimum streamflows similar to flows specified in Forest Service condition 29, Minimum Streamflows (see appendix I-2, table 2).
- BLM condition 5: similar to Forest Service condition 29, Canal Outages.
- BLM condition 6: Make an effort to avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park powerhouse in a synchronous condense mode (motoring) when the unit is not generating electricity.
- BLM condition 7: similar to Forest Service condition 29, part 6, as applicable only for Bear River below Dutch Flat afterbay dam, as shown in appendix I-2, table 6.
- BLM condition 8: Manage the flows in the Bear River below Rollins dam to balance outflows with inflows when Rollins reservoir elevation is within the top 2 to 3 feet of the reservoir to eliminate rapid fluctuations in the Bear River below Rollins dam.
- BLM condition 9: Relocate the LWD that accumulates on the upstream side of Rollins dam spillway log boom to the downstream side of the log boom; allow the LWD between the log boom and spillway to pass over the spillway when the reservoir spills.
- BLM condition 10: Monitor foothill yellow-legged frog in Steephollow Creek from the confluence with the Bear River for a distance of 1,000 meters upstream to assess if spills from the Chicago Park conduit result in adverse effects on the foothill yellow-legged frog population in Steephollow Creek.
- BLM condition 11: similar to Forest Service condition 30.
- BLM condition 12: similar to Forest Service condition 29, Ecological Group.
- BLM condition 13: similar to Forest Service condition 31.
- BLM condition 15: similar to Forest Service condition 33.
- BLM condition 16: similar to Forest Service condition 34, Vegetation and Non-Native Invasive Plant Management Plan.
- BLM condition 17: similar to Forest Service condition 34, Monitor Animal Losses in Project Canals.
- BLM condition 18: similar to Forest Service condition 34, Replacement of Wildlife Escape and Crossing Facilities.
- BLM condition 19: similar to Forest Service condition 34, Bald Eagle Management Plan.

- BLM condition 20: similar to Forest Service condition 34, Special Status Species.
- BLM condition 21: similar to Forest Service condition 34, Annual Review of Special Status Species Lists.
- BLM condition 22: similar to Forest Service condition 34, Bat Management.
- BLM condition 23: similar to Forest Service condition 35.
- BLM condition 24: In consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board, prepare an LWD Management Plan for Dutch Flat afterbay approved by BLM. Upon Commission approval, implement the Plan.
- BLM condition 25: (Similar to Forest Service condition 26.) File with the Commission a plan developed in consultation with the Forest Service, BLM, California Fish and Wildlife, and the California Water Board and approved by BLM that includes: (1) assessment of landslide hazards for slopes above and below open sections of canal and other project facilities including slope stability analysis in locations that are considered moderately to highly unstable; (2) assessment of past canal breach areas to determine erosive condition of slopes below these areas; (3) conduct an assessment of penstock and other drainage structure emergency and maintenance release; and (4) include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations
- BLM condition 26: similar to Forest Service condition 41.
- BLM condition 27: similar to Forest Service condition 38.
- BLM condition 28: similar to Forest Service condition 40.
- BLM condition 29: similar to Forest Service condition 39.
- BLM condition 30: similar to Forest Service condition 37.
- BLM condition 31: similar to Forest Service condition 41, General Measures for all Recreation Sites.
- BLM condition 32: similar to Forest Service condition 41, Vegetation Management in Recreation Sites.
- BLM condition 33: Dutch Flat afterbay day use recreation site: Make a good faith effort to purchase a parcel of land or obtain a long-term lease or easement for use of such property for day use recreational activities that will include parking for six vehicles, six picnic tables, kiosk sign, and a restroom facility.
- BLM condition 34: Sign an assistance agreement with BLM and develop a rehabilitation plan with the BLM Mother Lode Field Office to block, gate, and rehabilitate roads and trails agreed to by the licensee and BLM that spur off the Haul Road, Chicago Park Powerhouse Road, Chicago Park Conduit Road, and Lowell Hill Road.

- BLM condition 35: Enter into a recreation operation and maintenance agreement to provide \$30,000 annually for operation maintenance, law enforcement patrolling, and administration in accordance with the Recreation Plan (see condition 27).
- BLM condition 36: similar to Forest Service condition 41, Recreation Plan Revision.
- BLM condition 37: similar to Forest Service condition 41, Recreation Costs on Managing Facilities.
- BLM condition 38: similar to Forest Service condition 43.
- BLM condition 39: similar to Forest Service condition 44.
- BLM condition 40: similar to Forest Service condition 45.
- BLM condition 41: similar to Forest Service condition 27.
- BLM condition 42: similar to Forest Service condition 1.
- BLM condition 51: (Similar to Forest Service condition 23.) As part of the occupancy and use of the project area and as a continuing responsibility, reasonably identify and report all known or observed hazardous conditions on or directly affecting BLM lands within the project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License.
- BLM condition 52: similar to Forest Service condition 12.
- BLM condition 56: similar to Forest Service condition 16.

2.3 STAFF ALTERNATIVE¹⁰

2.3.1 Drum-Spaulling Project

Under the staff alternative, the project would include PG&E's proposed environmental measures (see section 2.2.3.1), as modified below, and additional staff-recommended measures.

2.3.1.1 PG&E Protection, Mitigation, and Enhancement Measures Modified by Staff

Our modifications to PG&E's proposed measures are shown below:

Aquatic Resources

- Implement extreme critically dry water year type flows in the second year of two sequential critically dry years (Measure DS-AQR1, Part 1).

¹⁰ In some cases, we include a "Staff Alternative with Mandatory Conditions" that includes the mandatory conditions that are excluded from the Staff Alternative. Since there is not a significant difference between the Staff Alternative and Staff Alternative with Mandatory Conditions, we do not evaluate it as a separate alternative in this draft EIS.

Terrestrial Resources

- Modify the proposed Vegetation Management Plan to extend management to non-federal project lands, and include the protection of culturally significant plant species (Measure DS-TR1).
- Prepare an annual report of animal losses in project canals that includes recommendations address animal mortalities, including implementation schedule and schedule of implementation and distribute to appropriate agencies (Measure DS-TR2).
- Modify measures to protect channel morphology and riparian vegetation of the Bear River upstream of Forest Service lands to include use of level loggers and monumented cross-sections (Measure DS-TR4):

Recreation Resources

- Modify the Recreation Plan with regard to the implementation schedule, trail development, campground upgrades, accessibility improvements, parking and road improvements, signage, water systems, maintenance, and recreation monitoring and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose (Measure DS-RR1).
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet year-round (Measure DS-RR2) year round.

Cultural Resources

- Modify the HPMP to include evaluation of eight cultural resource sites for their National Register eligibility; for those sites determined to be eligible, assess effects and resolve any project-related adverse effects. Implement plan upon license issuance (Measure DS-CR1).

Land Use and Aesthetic Resources

- Modify the proposed Fire Prevention and Response Plan to include all project lands and to include a period of review and revision (Measure DS-LU2).
- Implement the Recreation Plan for upgrades, maintenance, and development of new project recreation facilities on federal lands (Measure DS-RR1), as modified with regard to the implementation schedule, trail development, campground upgrades, accessibility improvements, parking and road improvements, signage, water systems, maintenance, and recreation monitoring.
- Provide recreation flow information (Measure DS-RR2) year round.

2.3.1.2 Additional Measures Identified by Staff for the Drum-SpaULDing Project

In addition to the foregoing measures proposed by PG&E, as modified by staff, the staff alternative also includes the following additional measures identified by staff based on agency, tribal, and non-governmental organization recommendations and our analysis:

- Develop and implement a Large Woody Debris (LWD) Management Plan that would monitor existing conditions and guide development of stream-reach and facility-specific management plans to pass LWD at project dams and diversions for protection and enhancement of downstream aquatic habitat.
- Develop and implement a Bear River Management Plan to assess riparian vegetation and bank stability conditions in the Bear River above the Drum afterbay on Forest Service lands that may be affected by high flow pulses during winter spills from Drum canal. As part of the plan, provide baseline and long-term monitoring of riparian vegetation, erosion and bank stability, and fixed geomorphic baseline channel transects.
- Provide additional summer flows to the South Yuba River below Lake Spaulding dam (Spaulding No. 1 and No. 2 Development) to manage water temperature for resident aquatic resources by implementing the Supplemental Flow Schedule specified by Forest Service condition 29.
- Establish an Ecological Group to support implementation, review, and management of the South Yuba River supplemental flow releases below Lake Spaulding dam.
- Develop and implement a Jordan Creek diversion decommissioning plan for the proposed removal of water diversion and transport structures that have not been used for project operations for many years.
- Obtain prior agency approval and restrict the use of pesticides near special status species on federal project lands.
- Construct and modify wildlife seven crossings on Drum and South Yuba canals to minimize wildlife injury and mortality associated with movement across these project canals.
- Develop a wildlife crossing plan for the Bear and South canals to minimize mortality and improve wildlife movement.
- Annually review the Forest Service, BLM, federal, and state special status species lists and assess new species on federal land to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Record annually all incidental observations of bird collision/electrocutions along the Bowman-Spaulding transmission line and replace or retrofit problem power poles as appropriate. Use raptor-safe powerline design for new power lines or when replacing existing structures to reduce raptor injury and mortality.
- Implement bat management measures including installing exclusion devices to minimize disturbance during project operation and maintenance.
- Develop and implement a fish stocking plan for stocking in Lake Spaulding, the Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, to include provisions for stocking fish in additional project reservoirs based on monitoring of recreational use and angling pressure over the term of the new license (replaces PG&E's proposal to pay for fish stocking).

- Develop and implement a hazardous substances plan for oil and hazardous substances storage and spill prevention and cleanup.

2.3.2 Yuba-Bear Project

2.3.2.1 NID Protection, Mitigation, and Enhancement Measures Modified by Staff

The staff alternative incorporates NID's proposed environmental measures (see section 2.2.3.2, *Proposed Environmental Measures*), as modified by staff:

Aquatic Resources

- Implement extreme critically dry water year type flows in the second year of two sequential critically dry years (Measure YB-AQR1, Part 1).
- Canal Outages – Implement minimum streamflows during canal outages in Bowman-Spaulding canal and Drum-Spaulding's Drum canal.

Terrestrial Resources

- Modify the Vegetation Management Plan and Non-Native Invasive Plant Management Plan to extend management to non-federal project lands, and include the protection of culturally significant plant species (Measures YB-TR1 and YB-TR2).
- Prepare an annual report of animal losses in project canals that includes recommendations to address animal mortalities including implementation schedule and schedule of implementation and distribute to appropriate agencies (Measure YB-TR2).
- Modify foothill yellow-legged frog monitoring population in Steephollow Creek to include further reduction of large magnitude spills and increased monitoring of the frog (Measure YB-AQR4).

Recreation Resources

- Modify the Recreation Plan with regard to the implementation schedule, trail development, campground upgrades, accessibility, parking and road improvements, boat launches, water systems, and monitoring, and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose (Measure YB-RR1).
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet year-round (Measure YB-RR2).

Land Use and Aesthetic Resources

- Modify the proposed Fire Prevention and Response Plan to include all project lands and to include a period of review and revision (Measure YB-LU2).
- Modify the Rollins upgrade construction hazardous materials spill prevention, control and countermeasure plan, to address spill prevention, control, and countermeasures for all project uses/activities on all project lands (Measure YB-WR1).

- Modify the recreation facilities construction hazardous materials spill prevention, control and countermeasure plan to address spill prevention, control, and countermeasures for all project uses/activities on all project lands (Measure YB-LU2).

2.3.2.2 Additional Measures Identified by Staff for the Yuba-Bear Project

In addition to the foregoing measures proposed by NID, as modified by staff, the staff alternative also includes the following additional measures identified by staff based on agency, tribal, and non-governmental organization recommendations and our analysis:

- Prepare and implement a Fish Entrainment Protection Plan for the Milton-Bowman conduit, including design, installation, and seasonal operation of fish screens to minimize entrainment of juvenile fish into the conduit.
- Prepare and implement a LWD management plan to ensure passage of LWD at project dams and diversions to support downstream aquatic habitat, as necessary, including Middle Yuba River below Jackson Meadows dam, Canyon Creek below Bowman dam, Bear River below Dutch Flat afterbay dam, and Bear River below Rollins dam.
- Implement minimum streamflows below Fall Creek diversion dam to protect and enhance aquatic habitat.
- Provide one new wildlife crossing on Bowman-Spaulding canal and maintain two existing crossings to minimize wildlife injury and mortality associated with movement across this project canal.
- Annually review special status species list and assess new species on federal project lands to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Develop and implement a fish stocking plan that addresses stocking in Rollins reservoir, Jackson Meadows reservoir, Bowman Lake, and Faucherie Lake, but also includes provisions for stocking fish in additional project reservoirs based on changes in recreational use and angling pressure over the term of the new license (replaces NID's proposal to pay for fish stocking).

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We considered several alternatives to the applicants' proposal, but eliminated them from further analysis because they are not reasonable in the circumstances of this case. They are: (1) issuing a non-power license; (2) Federal Government takeover of the project; and (3) retiring the project.

2.4.1 Issuing a Non-Power License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license, and we have no basis for concluding that either project should no longer be used to produce power. Thus, we do not consider a non-power license a realistic alternative to relicensing either project in this circumstance.

2.4.2 Federal Government Takeover of the Projects

We do not consider federal takeover of the Drum-Spaulding Project to be a reasonable alternative.¹¹ Federal takeover and operation of the project would require Congressional approval. Although that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.4.3 Retiring the Projects

Project retirement of either the Drum-Spaulding or Yuba-Bear Projects could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. No participant has suggested that dam removal would be appropriate in either of these cases, and we have no basis for recommending it. Project reservoirs serve other important purposes, such as providing recreational opportunities, consumptive water supply, and flood control, regardless of whether power is produced. Thus, although we analyze PG&E's proposal to remove the Jordan Creek diversion dam as part of its licensing proposal, dam removal is not a reasonable alternative to relicensing either project with appropriate protection, mitigation, and enhancement measures.

The second project retirement alternative would involve retaining the dams and control structures and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This alternative would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by projects is needed, a source of replacement power would have to be identified. In these circumstances, although we analyze PG&E's proposal to retire the Alta powerhouse unit 2 as part of its licensing proposal, we do not consider removal of the electric generating equipment to be a reasonable alternative.

¹¹ Federal takeover is not applicable where the applicant, such as NID, is a state or municipal entity.

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3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinities; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.), and we first describe each resource's affected environment, which includes historic and current conditions. The existing condition is the baseline against which environmental effects of the proposed action and alternatives are compared. Next, we describe the environmental effects of the proposed projects, including an assessment of the effects of proposed protection, mitigation, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Unless otherwise identified, the sources of our information are the license applications for the projects (PG&E, 2011a; NID, 2011a). We provide citations for information obtained from other sources, including subsequent filings related to the projects.

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The projects are located on the western slope of the Sierra Nevada in northern California, within Nevada, Placer, and Sierra Counties. The Sierra Nevada Range is about 400 miles long and runs south-southeast to north-northwest in the eastern portion of California. The Sierra Nevada crest forms the eastern limit of the Yuba and Bear River basins and trends north-northwest. Drainage within the basins is west to southwest from the Sierra Crest to the adjacent floor of the Sacramento Valley. To the east of the basins, downfaulting of the eastern Sierra face has affected drainage evolution by creating channels that now have their headwaters facing east. The project areas include facilities ranging in elevation from about 435 feet msl at the Drum-Spaulding Project's Newcastle powerhouse to 7,840 feet msl at the Drum-Spaulding Project's White Rock Lake dam. The projects are located in the Sacramento River Hydrologic Region of California. Portions of each project are located in the South Yuba River and Bear River basins. In addition, some Yuba-Bear Project facilities are located in the Middle Yuba River basin, and some Drum-Spaulding Project facilities are located in the North Fork of the American River basin. The two projects are intimately interconnected at both upstream and downstream reaches.

Land within the basins has a patchwork of ownership. At the upper elevations above 3,000 feet, the Forest Service manages a majority of the land as part of Tahoe National Forest. Other land managers and owners above 3,000 feet include private corporations such as timber companies, NID, PG&E, and other private entities. Below 3,000 feet, land in the basins is predominantly privately owned, with small federally owned portions managed by the Forest Service as part of Tahoe National Forest, by the BLM as part of the Sierra Resource Management Area, and by Reclamation. The portions of land within the project areas managed by federal agencies are administered according to their respective resource management plans. The counties are the primary agencies for establishing land use policies for private land within the basins; County General Plans provide the land use policies for each county. In general, most of the land in Placer, Nevada, and Sierra Counties near the projects is designated for timber, grazing, and open space uses. This is particularly true in the upper portions of the basins. At the lower elevations, the lands are more often designated by the counties for residential and agricultural uses.

The basins experience warm, dry summers and cool winters with precipitation falling generally as snow above 5,000 feet in elevation and as rain in the lower elevations. The National Weather Service maintains a monitoring station (no. 044713) located at Blue Canyon, California. Blue Canyon is at an elevation of 5,280 feet, which is roughly the elevation mid-point of the project vicinities. July air temperatures at Blue Canyon range from an average high of 77.3°F to an average low of 59.3°F. The average high temperature for January is 43.6°F, while the average low temperature is 31.3°F. The annual average high and low temperatures for Blue Canyon are 58.3°F and 42.9°F, respectively. Annual mean total precipitation at Blue Canyon is 69.89 inches, most of which (65 percent) occurs from December

through March. The summer months of June through August produce 2 percent of the total annual average precipitation.

Distinct vegetation types in the vicinity of the projects are distributed along an elevation gradient creating bands with characteristic or dominant species. These bands somewhat overlap and intergrade with each other forming transition zones on their outer edges. Vegetation in the foothills is dominated by an overstory of gray pine and ponderosa pine, with a mixture of small stands of hardwoods and low-elevation chaparral shrubs. In riparian areas, black cottonwood, white alder, and valley oak are common. At mid elevations, dominant vegetation includes incense cedar, Douglas fir, white fir, madrone and sugar pine, and significant stands of Brewer's oak, which occupy south-facing slopes and areas of annual grasslands. Chaparral species include whiteleaf manzanita, greenleaf manzanita, mountain whitethorn, wedgeleaf ceanothus, deerbrush, and poison oak. Riparian areas are dominated by white alders, maple, and willows. At higher elevations, the forested areas are dominated by incense cedar, red fir, white fir, and Jeffrey pine overstory, with lodgepole pines in moist soils in meadows and along shorelines. Black oak, willow, quaking aspen, and mountain alder are common deciduous trees and may form a subcanopy beneath the conifer overstory. Some areas are barren, devoid of vegetation due to rocky and steep terrain with little to no soil layer. The shrub layer is dominated by mountain whitethorn, huckleberry oak, pinemat manzanita, and bush chinquapin.

Including the Drum-Spaulding and Yuba-Bear Projects, there are 11 hydroelectric projects located in the Yuba and Bear River Basins (Table 3-1). Additionally, there are two U.S. Army Corps of Engineers debris dams on the main stem of the Yuba River. The more upstream facility is Englebright dam, which is located 24 miles upstream of the Yuba River's confluence with the Feather River. The dam forms the Corps' Englebright reservoir, which is about 9 miles long and has a usable storage capacity of about 70,000 acre-feet. Daguerre Point dam, which has no appreciable storage, is located 12.6 miles downstream of Englebright dam and 11.4 miles upstream of the Yuba River's confluence with the Feather River.

Table 3-1. Existing FERC-licensed water projects in the Yuba and Bear River basins. (Source: NID, 2011a)

FERC Project No.	Project Name	License Holder	Waterway	River Watershed	License Expiration Date	FERC Authorized Capacity (MW)
1403	Narrows	PG&E	Yuba River	Yuba	January 2023	12.00
2246	Yuba River	YCWA	Yuba River	Yuba	March 2016	361.90
3075	Virginia Ranch Dam	BVID	Yuba River	Yuba	Exempt	1.00
6780	Deadwood Creek	YCWA	Deadwood Creek	Yuba	August 2038	19.63
5930	Scotts Flat	NID	Deer Creek	Yuba	Exempt	0.83
2266	Yuba-Bear	NID	Yuba, Bear Rivers and tributaries	Yuba, Bear	April 2013	79.32

Table 3-1. Existing FERC-licensed water projects in the Yuba and Bear River basins. (Source: NID, 2011a)

FERC Project No.	Project Name	License Holder	Waterway	River Watershed	License Expiration Date	FERC Authorized Capacity (MW)
2310	Drum-Spaulding	PG&E	South Yuba, Bear, North Fork American Rivers and tributaries	Yuba, Bear, North Fork American	April 2013	190.0
2981	Lake Combie	NID	Bear River	Bear	Exempt	1.50
7731	Combie North Aqueduct	NID	Bear River	Bear	Exempt	0.35
2997	Camp Far West	SSWD	Bear River	Bear	June 2021	6.80
7580	Vanjop No. 1	SSWD	Bear River	Bear	Exempt	0.42

BVID = Browns Valley Irrigation District

SSWD = South Sutter Water District

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (40 CFR section 1508.7), cumulative effects is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we have identified water quantity and water temperature as having the potential to be cumulatively affected by the proposed projects in combination with other past, present, and foreseeable future activities¹ Cumulative effects on aquatic biota are primarily the result of factors affecting water quantity and temperature.

Other activities in the area that could interact with the Drum-Spaulding and Yuba-Bear Projects to affect resources cumulatively include other hydroelectric projects and water diversions in the Yuba and Bear River Basins (section 3.1). Flows in Mormon Ravine in the American River Basin are dominated by flows from Drum-Spaulding's Newcastle Development and cumulatively influence the size and persistence of the cold water pool in Folsom reservoir, in conjunction with other upstream hydroelectric projects and diversions from: (1) the Middle and North Fork American Rivers (Middle Fork American River Project [FERC No. 2079-069]); (2) Upper American River Project (FERC No. 2101);

¹ In Scoping Document 2, we identified water and aquatic resources as the resources that would be addressed in the cumulative effects analysis. Our evaluation of water quantity and temperature and their associated influence on aquatic biota captures those effects.

(3) Georgetown Divide Public Utility District's Stumpy Meadows Project (a non-FERC regulated project); (4) Foresthill Public Utility District's Sugar Pine Dam Project; (5) PCWA's Pulp Mill Canal Diversion Dam Project; and (6) PCWA's American River pump station. Operation of each of these projects is expected to be similar in the future compared to current operations.

Non-project diversions and withdrawals by other users affect instream flows in project-affected reaches. NID and PCWA are the two largest water providers with non-project diversions from project-affected reaches and canals. Recent demands for water years 2001-2009 were about 139,000 acre-feet for NID and 105,000 acre-feet for PCWA. Annual water demand is projected to increase to 171,000 acre-feet by 2032 and 201,000 acre-feet by 2062 for NID and 114,000 acre-feet by 2032 and 118,000 acre-feet by 2062 for PCWA. NID has significant withdrawal points: (1) below the Deer Creek powerhouse on the South Fork Deer Creek; (2) below the Bear River canal diversion dam on the Bear River; (3) from Rock Creek reservoir; (4) from South canal; and (5) from Auburn Ravine. Major PCWA withdrawals points are located: (1) below Alta powerhouse on the Little Bear River; (2) upstream of Halsey forebay from Bear River canal; (3) from Upper Wise canal upstream of Rock Creek reservoir; (5) from Wise forebay; and (6) at several locations along South canal. NID's and PCWA's historical water rights for water delivery are senior to and hold priority over hydroelectric power generation.

Timber harvesting, grazing, and mining activities in these watersheds can also affect water quantity and quality (including temperature, turbidity, and metal contaminant concentrations) in associated sub-basins and are outside of the Commission's authority to regulate.

3.2.1 Geographic Scope

The geographic scope of the cumulative effects analysis defines the physical limits or boundaries of the proposed actions' effects on resources. Because the proposed actions would affect resources differently, the geographic scope for each resource may vary. The geographic scope for the cumulative effects on water quantity and temperature would extend generally from the headwaters of the various project waterbodies downstream to Englebright Lake on the South Yuba River, Our House dam on the Middle Yuba River, Lake Combie on the Bear River, and Folsom Lake on the American River.

3.2.2 Temporal Scope

The temporal scope of our cumulative analysis in the EIS includes past, present, and future actions and their possible cumulative effects on each resource. Based on the license terms, the temporal scope looks 30 to 50 years into the future, concentrating on the effect of reasonably foreseeable future actions on the resources. The historical discussions are, by necessity, limited to the amount of available information for each resource. We developed the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific cumulative and site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EIS. Based on this, we have determined that geology and soils; aquatic resources; terrestrial resources; threatened and endangered species; recreation resources; cultural resources; and land use and aesthetic resources may be affected by the proposed action and action alternatives. We present our recommendations for the in sections 5.1.2 and 5.2.2, *Comprehensive*

Development and Recommended Alternative, for the Drum-Spaulding and Yuba-Bear Projects, respectively.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

3.3.1.1.1 Geologic and Physiographic Setting

The Drum-Spaulding and Yuba-Bear Projects are sited within eight major geologic formations, which affect surficial processes, erodibility, and drainage development: Shoofly and Calaveras formations, Bowman Lake and Sierra Nevada batholiths, Yuba River pluton, Smartville complex, Valley Springs formation, and the Mehrten formation. Bedrock geology within the project vicinity is mainly composed of Paleozoic metasediments and metavolcanics (i.e., Shoofly and Calaveras formations), Paleozoic and Mesozoic granitic rocks (i.e., Bowman Lake and Sierra Nevada batholiths and Yuba River pluton), and a Mesozoic ophiolite complex (i.e., Smartville complex). Younger bedrock geology within the project vicinity includes Eocene marine rocks and Eocene auriferous sediments (i.e., Tertiary river gravels) deposited by the ancestral Yuba River. Other Tertiary units present include Miocene-Pliocene rhyolites, rhyolitic sediments (i.e., Valley Springs formation), and andesitic lahars (i.e., Mehrten formation) that cap some ridgetops. Much of the higher-elevation terrain underlain by Mesozoic granitic rocks has been overridden by ice.

The major physiographic feature within the project vicinity is the Sierra Nevada Range, which is about 400 miles long and runs south-southeast to north-northwest in the eastern portion of California. The Sierra Nevada crest forms the eastern limit of the Yuba and Bear River Basins and trends north-northwest. Drainage within the Yuba and Bear River Basins is west to southwest from the Sierra Crest to the adjacent floor of the Sacramento Valley. To the east of the basins, down faulting of the eastern Sierra face has affected drainage evolution by creating channels that now have their headwaters facing east.

Uplifting and tilting of the Sierra Block reorganized drainage networks and initiated a period of sustained channel incision, and many of the modern river channels have elevations below Tertiary-age river channels. The ancestral (Tertiary Period) Yuba River had cut about 1,000 feet below a surface defined by San Juan, Washington, and Harmony ridges. These ancestral deep channels drained north-northwest across the strike of the modern drainages. The south branch of the ancestral Yuba River flowed north from Gold Run to Badger Hill, then southwest to Smartville and Marysville. The ancestral channels were filled first by very coarse, boulder material rich in gold, followed by finer gravel and sand deposits, also rich in gold. These Tertiary gravel deposits are the source of the gold heavily mined in the late 1800s.

Tertiary channels/gravels were buried by rhyolitic and andesitic volcanics, then severely eroded and exposed by deep fluvial incision. The modern Yuba and Bear Rivers began incising 5 million years ago. Modern foothill channels strike perpendicular to the ancestral channels and have downcut, leaving the deposits of the ancestral channels as upland gravels.

The basins were also affected by extensive Quaternary Period glacial erosion. Pre-glacial Bear River headwaters were captured by the South Yuba River in response to ice-damming of the upper Bear River, probably during maximum glacial advance, making the upper Bear River a glacial trough filled with outwash. Today, outwash deposits extend downstream from Bear Valley and grade into coarse channel lag gravel and boulders upstream of Drum powerhouse. The South Yuba Gorge truncates the Bear Valley trough at its upper end, which has isolated the Bear Valley from substantial sediment or hydrologic input.

The modern Yuba and Bear River Basins drain the northwestern Sierra Nevada via a series of deep canyons separated by high, steep-sided ridges and a parallel drainage network. The parallel drainage network results in narrow ridges between small tributaries, small tributary watersheds, and low tributary sediment loads under natural conditions; prehistoric debris fans at tributary junctions were not common. Stratigraphic evidence indicates the presence of stepped, Quaternary Period terraces similar to piedmont channels flowing out of the Sierra Nevada, but these terraces were generally buried by mining sediment. Downcutting, as noted specifically in the Bear River, through the relatively soft Paleozoic metamorphic rock (Shoofly Complex) has created a deep, v-shaped canyon where short, steep-sided tributary drainages are typical. Distinctive v-shaped inner gorge areas are common in all of the major drainages in the vicinity of the projects.

Seismicity

The projects are in an area of low to moderate seismicity, with most seismic activity concentrated east and southeast of the project areas near Lake Tahoe and to the northwest of the project areas, south of Lake Oroville. Expected seismic shaking intensities within the projects area from these nearby faults are considered to be low.

A number of north-to-northwest trending faults cross the projects, most of which are associated with the Foothills Fault System. Among the more significant faults are the Grass Valley Fault, the Melones Fault Zone, the Big Bend/Wolf Creek Fault Zone, the Giant Gap Fault, and the Camel Peak Fault Zone. None of the mapped faults within the project areas has been active in Quaternary time. A portion of the Giant Gap fault south of the projects is designated as having been active in Quaternary time. The nearest active fault (defined by the California Geological Survey as movement within the past 11,400 years) is the Cleveland Hill Fault located to the northwest of the projects near Lake Oroville; that fault had recorded movement in 1975. Other active faults are located to the east and southeast of the projects near Lake Tahoe.

3.3.1.1.2 Reservoir Shorelines

Erosion Sites

Sites for erosion evaluation in the project areas were selected based on their potential to affect aquatic resources of concern (water quality and biota), project infrastructure, public and private access, and public health and safety. The majority of the projects' reservoir shorelines are composed of bedrock, sand, and rock fragments up to the high-water surface elevations of the reservoirs. Water lines are visible along bedrock shorelines in many of the reservoirs when water levels are lowered, reflecting the various stages of operation in the reservoirs. Above the high-water line, tree vegetation dominates the shorelines and the landscape, much of which is evergreen. Similar vegetation also exists on rock outcroppings that form small islands in some of the reservoirs. With the exception of Rollins reservoir (Yuba-Bear Project), reservoir shorelines are free of residences.

Reservoirs throughout the watershed are generally not at risk of shoreline erosion because they are composed of bedrock and/or have gently sloping shorelines, and most reservoirs do not experience daily water levels fluctuations that would threaten slopes. The forebays that are off-channel fluctuate daily but turbid releases have not been reported as an issue or observed by PG&E or NID. In a few isolated areas, trees may have fallen into the reservoirs. These trees are gathered by PG&E and NID at a log boom or during reservoir maintenance and piled off-site or burned in piles. Judging from the small amounts of debris pulled from the reservoirs (discussed in the LWD section of section 3.3.1.1.3, *Project-Affected Stream Reaches*, below), debris removal and disposal are infrequent. Shorelines are considered stable on all project reservoirs.

Sediment Deposition

Alluvial deposits have accumulated in some of the projects' larger reservoirs (e.g., Lake Spaulding [Drum-Spaulding Project] and Rollins reservoir [Yuba-Bear Project]), though this deposition has not required PG&E and NID to dredge or otherwise remove sediment from any project reservoirs or to modify operations of the projects.

Prior to relicensing, PG&E and NID performed bathymetric surveys of the projects' larger reservoirs. Table 3-2 provides an estimate of rate of sedimentation in these reservoirs based on the applicants' recent bathymetric surveys as compared to as-built drawings. Changes in volume are based on as-built surveys, and the accuracy of these surveys cannot be independently verified. In some cases, the calculated sedimentation rate is close to the "noise" of the uncertainty due to accuracy of the as-built data.

None of the deposition rates in Table 3-2 is high compared to selected reservoirs in the United States, in which the loss of storage ranged from 0.9 to 60.2 percent, and the median was 9.4 percent. As a regional comparison, the USACE's Englebright reservoir, with over 461 square miles of drainage, accumulated 17,750 acre-feet of sediment (4.5 percent) over 61 years, which results in a deposition rate of 0.6 acre-feet per square mile per year. Jackson Meadows reservoir, Dutch Flat afterbay, and Rollins reservoir are on the high end of the regional sedimentation rate, but not as compared to a wide range of reservoirs nationwide. Mining sediments have accumulated in Rollins reservoir, which contributes to a higher deposition rate, and Drum afterbay was affected by sediment delivered due to a flume failure in 1986. There are wide variations in rates of sediment production and reservoir sedimentation within physiographic provinces, so there is no defined "typical" rate. Also, as stated above, PG&E and NID have not dredged nor otherwise removed sediment for any project reservoir.

Sediment Delivery

Besides the projects' roads and trails that are discussed below, there are no known potential major upland sources of sediment or erosion, such as slope failures or mass wasting areas, associated with the projects. Recreation facilities, particularly in more gently sloping areas, have the potential to contribute sediment from surface erosion, although their surface area is negligible in comparison to the size of the watershed.

In 2008 and 2009, PG&E and NID inspected 70 discrete Primary Project Roads or Trails segments encompassing 57 miles of road and 4 miles of developed trail. The applicants assessed the condition of all road features (e.g., surface, water crossings, culverts, bridges, and drainages) to determine if the road or trail met appropriate maintenance levels, and noted any environmental damage, such as excessive erosion or bank instability. More than 1,200 discrete features were identified, including 204 water crossings and 289 drainage features (e.g., culverts, drainage ditches). Systematic analysis of attribute data, including condition, maintenance requirements, and erosion potential, was used to establish a ranking process applicable to both discrete features and entire road segments. Each road segment was ranked as "excellent," "good," or "poor."

Nineteen segments (about 30 percent) of the Primary Project Roads were ranked as "poor," generally because of the condition of water crossings (e.g., undersized), drainage features (e.g., damaged culvert), or environmental damage (e.g., surface erosion and sedimentation at culvert outlet). Table 3-3 lists these 19 road segments, including length, overall erosion risk, and identified problem. All of the Primary Project Trails were ranked as being in "good" condition.

Table 3-2. Sedimentation deposition in the larger reservoirs of the Drum-Spaulding and Yuba-Bear Projects. (Source: PG&E, 2011a; NID, 2011a)

Reservoir	Contributing Drainage Area (mi ²)	In-Service Year	Years Between Service Data and Bathymetric Survey	Gross Storage (ac-ft)		Difference		Rate of Deposition (ac-ft/mi ² /yr)
DRUM-SPAULDING PROJECT								
Blue	0.24	1875	134	Unknown	4,042	Unknown	Unknown	Unknown
Fordyce Lake	31.7	1864	145	50,073	49,525	-548	-1.10%	0.1
Lake Valley	4.54	1887	120	7,964	7,902	-62	-0.80%	0.1
Rock Creek	2.17	1916	91	548	485	-63	-11.50%	0.3
Lake Spaulding	118	1912	96	75,034	75,912	878	1.20%	*
YUBA-BEAR PROJECT								
Jackson Meadows	37.6	1965	42	69,205	67,435	-1,770	-2.60%	1.1
Bowman Lake	10.7	1928	81	68,510	68,363	-147	0.20%	0.2
Dutch Flat afterbay	9.2	1965	42	2,037	1,397	-640	-31.40%	1.7
Rollins	104	1965	42	65,988	58,682	-7,306	-11.10%	1.7

Table 3-3. Drum-Spaulding and Yuba-Bear Project roads with identified erosion problems. (Source: PG&E, 2011a; NID, 2011a)

Road Name	Length (miles)	Overall Erosion Risk	Average Road Width (feet)	Road Surface Treatment	Overall Road Condition	Identified Problems
DRUM-SPAULDING PROJECT						
Lower Peak Road	0.4	High	12	Native Rock	Poor	Erosion/several hazard trees
Lang's Crossing Spillway Road	0.6	Medium	20	Native Rock	Poor	Erosion
Drum Canal Access Road	1.7	Medium	12	Gravel/Native Rock	Poor	Erosion
PG&E Road	1.2	Low	13	Paved/Gravel	Poor	Erosion
Drum Canal Road	1.7	Low	13	Gravel/Rock	Poor	Erosion
Pittman Spill Channel North	1.8	High	12	Native Rock	Poor	Erosion/Landslide
Pittman Spill Channel South	1.5	High	12	Native Rock	Poor	Erosion/Landslide
Boardman Canal/PG&E Canal Road	0.2	High	12	Native Rock	Poor	Erosion
Drum No. 3 Penstock Access	1.0	High	11	Native Rock	Poor	Erosion
Downstream End of Little Tunnel	2.2	High	12	Native Rock	Poor	Erosion/Landslide
Telephone House Road	0.7	High	12	Native Soil	Poor	Erosion
Downstream Steephollow	1.4	High	11	Native Rock	Poor	Erosion
Chalk Bluff Spur Road	0.8	High	12	Native Soil	Poor	Erosion/Landslide
Drum Power House	4.4	High	14	Paved	Poor	Erosion/Landslide/ Blind Spots
13 Mile Spill	2.1	Medium	13	Gravel Rock	Poor	Erosion/Landslide

Table 3-3. Drum-Spaulding and Yuba-Bear Project roads with identified erosion problems. (Source: PG&E, 2011a; NID, 2011a)

Road Name	Length (miles)	Overall Erosion Risk	Average Road Width (feet)	Road Surface Treatment	Overall Road Condition	Identified Problems
YUBA-BEAR PROJECT						
Bowman-Spaulding Berm Road	0.8	Medium	10	Native Rock	Poor	Erosion/Landslide
Chicago Park Forebay Road	1.7	High	13	Gravel/Rock	Poor	Erosion
Chicago Park Forebay Road	0.6	High	14	Gravel/Rock	Poor	Landslide
French Lake Road	2.1	Medium	12	Native Rock	Poor	Erosion

3.3.1.1.3 Project-Affected Stream Reaches

Project-affected stream reaches are generally carved into steep canyons and are frequently characterized by exposed bedrock. Peak streamflows, which typically occur from snowfall runoff, continue to carve the streambeds into bedrock, and channel substrate generally consists of various sizes of rock fragments, boulders, and bedrock. Channel gradients are also relatively steep, up to and exceeding 10 percent in some localized areas.

Most stream channels are characterized by a coarse bed dominated by gravel- to cobble-size material, with low width-to-depth ratio, moderate to high slopes in relatively straight channels that may be either unconfined or confined. Channels often lack rhythmic bedforms, though flow obstructions such as boulders, bedrock outcrops, and LWD may force local pool and bar formation. Sediment supply is attendant on parent material, localized bank and hillslope failures, mobilized terrace material through side channel development, historic and current mining activities, and occasionally surface erosion.

There are large mining sediment deposits in most of the stream reaches affected by both projects to the west of Highway 80 that continue to affect the location of the stream and the riparian corridor by creating immobile channel boundaries and conditions that are not conducive to riparian colonization. For example, large deposits removed from the channel and placed alongside the channel inhibit riparian growth and channel migration (e.g., South Yuba River near Poormans Creek, Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development). Another example is the large amount of hydraulic mining debris (that does not hold water) that fills valleys (e.g., Bear River below Dutch Flat afterbay [Yuba-Bear Project]). The size of material deposited in the channel during flood events, and material remaining after winnowing of finer material, often greatly exceeds the dominant channel flow competence (i.e., sediment mobility during regulated median and high flows), and only the finer particles are mobile at the frequently occurring flows. The lack of finer material and spawning gravel in most stream reaches and the mobility of the finer material and spawning gravel suggest that the transport capacity exceeds the availability of finer material and spawning-sized gravel particularly in stream reaches heavily impacted by legacy mining debris.

High-energy flow events, such as floods in 1986 and 1997, are important as “reset” mechanisms in most project-affected stream reaches and work in combination with the effects of legacy mining debris. For example, in the South and Middle Yuba Rivers, the 1997 event exceeded 30,000 and 20,000 cfs respectively, which is an 18- and 22-year recurrence interval (based on mean daily annual peaks). Figure 3-1 shows examples of the influence of major storm events on hydrographs of four project-affected stream reaches: Canyon Creek below Bowman Lake dam (Yuba-Bear Project, Bowman Development), Middle Yuba River above Wolf Creek (Yuba-River, Bowman Development), North Fork of the North Fork American River below Lake Valley canal diversion dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development), and Bear River at Highway 20 (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) in Bear Valley. The blue lines represent unregulated estimates of what the hydrograph would look like with no regulation, and the red lines are the observed values (the Middle Yuba River above Wolf Creek had no gage, so values are hydrologic model estimates) representing regulated conditions at these same locations. The 1986 and 1997 flows were substantial in the Middle and South Yuba and the Bear River drainages west of Highway 80. In the case of the Bear River, 400 cfs was exceeded six times between 1993 and 2004. The gage for this site is very near the headwaters and most of this flow has historically been delivered from Drum canal because Bear River is periodically used as a conveyance reach to deliver water for both projects to Drum afterbay. In the North Fork of the North Fork American River, which is east of Highway 80, large events (though much lower than unregulated estimates) were observed in 1995, 1996, and 2002; the gage was out of service for the 1997 event. Unregulated synthesized data indicate that the water years of 1980, 1982, 1986, and 1997 likely influenced the drainages to the east of Highway 80, in addition to the observed 2002 event.

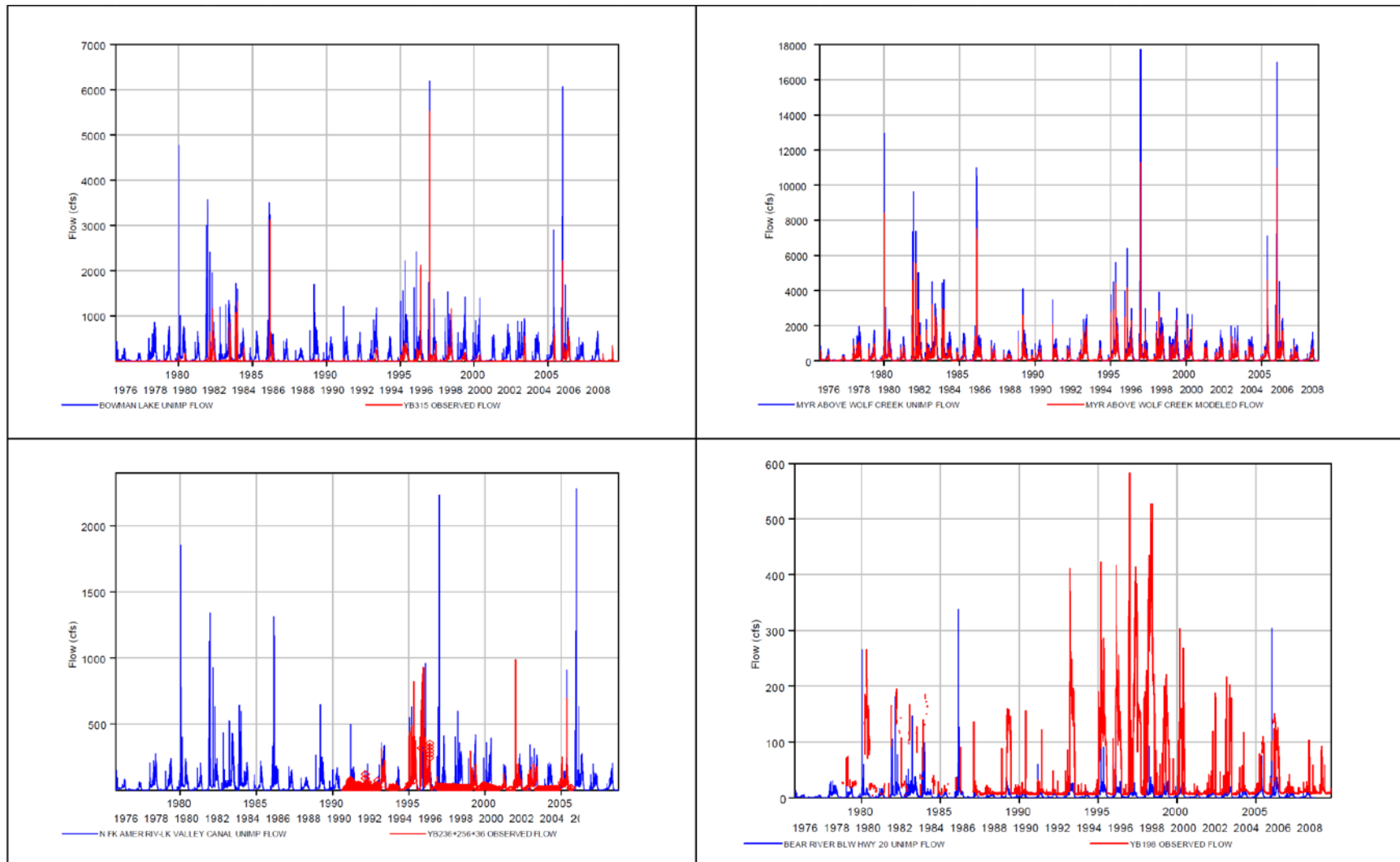


Figure 3-1. Examples of hydrographs of storm events in the area affected by both projects. Upper left is Canyon Creek at Bowman Lake, upper right is Middle Yuba River above Wolf Creek, lower left is North Fork of the North Fork American River at Lake Valley canal diversion, and lower right is Bear River at Highway 20 (blue is unregulated [unimpaired], red is observed/modeled). (Source: PG&E, 2011a; NID, 2011a)

Bankfull and Flood Discharges

Regulated bankfull discharge return intervals in the stream reaches studied by PG&E and NID ranged from less than 1 up to 3 years (Table 3-4), which is low compared to the range of return intervals of channel-forming flows (bankfull) in stable channels. However, the return interval is based on a relatively short period of record, and the peaks are dampened by using the mean annual daily peaks (i.e., lower values occur more frequently relative to higher values). Under regulated conditions, the first depositional surfaces that the streams encounter (also known as the “first break”) were at approximate recurrence intervals of less than 1 year to 29 years, with a median of about 1.5 years, which is closer to the range determined by researchers for bankfull discharge in stable channels. The estimated recurrence interval for regulated and unregulated floodprone discharge ranged from less than 2 years to over 500 years. This wide range is due not only to the difficulty in identifying bankfull depth in this morphologic setting, but also to the importance of flood events (e.g., the 1997 flood as a “reset” mechanism that created large deposits within and adjacent to the channel). Additionally, the recurrence interval is based on only 33 years of data and is based on the mean daily annual peaks. Floodprone surfaces have a greater probability of being inundated under unregulated relative to existing conditions. However, floodprone surfaces are based on maximum bankfull depth, which would likely be different under unregulated conditions, so the surfaces may not be “formed” at the same elevation. Floodprone return frequency would then be different; it is not just a matter of comparing the hydrology between regulated and unregulated conditions, but also a matter of the hydrological effect on channel morphology. It is a somewhat iterative process and there is inertia in the system (i.e., there may be a shift in hydrology but the change in hydrology has not yet caused a change in morphology).

Sediment Transport

PG&E and NID found that the majority of channel morphology study sites evaluated are characterized by large substrate, vertical confinement, low bank erodibility, and low fine sediment accumulation (PG&E and NID, 2011b). These conditions are indicative of low sediment supply relative to transport capability, which is common in steeper Sierra Nevada streams. PG&E and NID also evaluated the mobility of the substrate and trout spawning gravels at 25- and 50-percent exceedance flows under regulated and unregulated conditions. The study determined that flow regulation does not often change the frequency with which the median bed particle size would be mobilized under unregulated flow conditions. The larger particles within the cross sections were rarely mobile under 25- and 50-percent exceedance conditions for either regulated or unregulated conditions. Generally, the larger material in the channel exceeds the dominant channel flow competence (i.e., sediment mobility during regulated median and high flows). Only the smaller particles were mobile under regulated or unregulated conditions and were slightly more mobile under regulated conditions.

In evaluating individual cross sections, there was no change in the mobility of the median particle size in 47 of 49 cross sections under 50-percent exceedance flow conditions, and 41 of 49 transects under 25-percent exceedance flows. Under 50-percent exceedance flow, particles were more mobile under unregulated conditions in two cross sections. With 25-percent exceedance flows, median particles were more mobile under regulated conditions in five cross sections and under unregulated conditions in three cross sections.

Table 3-4. Bankfull, first break, and floodprone estimated discharges, and recurrence intervals (based on modeled mean daily annual maximums [1976-2008]) for regulated and unregulated conditions. (Source: PG&E, 2011a; NID, 2011a)

Site	Transect	Bankfull		First Break		Floodprone	
		Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)	Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)	Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)
DRUM-SPAULDING PROJECT							
Fordyce Lake dam stream reach	T7	207	1/<1	311	1.2/1	1,390	3/2
	T13	254	1/1	371	1.2/1	5,466	70/13
	T19	614	1.5/1.2	bankfull	1.5/1.2	6,308	149/18
Bear River reach #2, meadow sub-reach	LM2	68	<1/2.7	bankfull	<1/2.7	356	12
	MM5	185	1.5/9.2	bankfull	1.5/9.2	2,545	>500
	UM2	78	<1/3	bankfull	<1/3	944	>500
Lake Valley reservoir dam stream reach	T5	63	1.1/1	bankfull	1.1/1	876	66/9
	T6	80	1.2/1	bankfull	1.2/1	1,655	>500/30
	T7	24	<1/<1	84	1.2/1	240	3/2
	T13	14	<1/<1	168	1.5/1.4	1,318	269/18
YUBA-BEAR PROJECT							
Jackson Meadows dam stream reach	T1	486	2.5/1.3	bankfull	2.5/1.3	6,538	114/31
	T11	536	2.7/1.4	bankfull	2.7/1.4	6,251	98/29
Milton diversion dam stream reach	T1	554	1.1/1	1,275	1.6/1.3	8,533	15/9
	T3	297	1.05/1	1,157	1.5/1.3	6,515	11/6
	T6	206	1.01/<1	1,524	1.9/1.4	3,156	2.8/2

Table 3-4. Bankfull, first break, and floodprone estimated discharges, and recurrence intervals (based on modeled mean daily annual maximums [1976-2008]) for regulated and unregulated conditions. (Source: PG&E, 2011a; NID, 2011a)

Site	Transect	Bankfull		First Break		Floodprone	
		Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)	Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)	Discharge (cfs)	Recurrence Interval Regulated/ Unregulated (years)
Faucherie Lake dam stream reach	T7	127	1.3/1.1	1,532	29/22	5,973	>500/>500
	T15	144	1.4/1.1	466	3.8/2.7	3,274	305/162
	T18	36	1.0/<1	338	2.6/2	875	10/7
Bowman- Spaulding diversion dam stream reach	T3	141	1.1/<1	223	1.2/1	1,792	14/3
	T7	188	1.1/1	942	4/2	2,062	19/4
	Gage	250	1.6/1	bankfull	1.6/1	700	3.5/1.5
Dutch Flat afterbay dam stream reach	T4	183	3/1.3	292	2.5/1.5	2,199	3.5/7
	T13	189	3/1.3	bankfull	3/1.3	1,962	25/6
	T18	86	1.5/1.1	bankfull	1.5/1.1	617	4/2
DRUM-SPAULDING AND YUBA-BEAR PROJECT							
South Yuba reach #4	T6	258	1.0/<1	bankfull	1.0/<1	3,693	2.4/1
	T14	282	1.0/<1	759	1.2/<1	4,961	2.8/1.5
	T16	195	1.0/<1	332	1.0/<1	1,910	1.6/1
Bear River canal diversion dam stream reach	T1	1,180	1.5/1.5	bankfull	1.5/1.5	2,960	2.5/2.5
	T2	1,250	1.5/1.5	bankfull	1.5/1.5	3,650	2.8/2.8
	T3	650	1.2/1.2	bankfull	1.2/1.2	2,100	2/2

There were some differences between regulated and unregulated conditions in the mobility of trout spawning-sized gravels. Trout spawning gravels were mobile at 18 of 25 transects evaluated at the channel morphology study sites. Gravels were mobile at slightly more transects under regulated conditions for both median (50-percent exceedance) and high flows (25-percent exceedance). Of 25 transects, 17 demonstrated no change in trout spawning gravel mobility under regulated conditions as compared to unregulated flow conditions. In seven transects, median-sized trout spawning gravels were more mobile under regulated flow conditions, and in one transect the gravels were more mobile under unregulated conditions.

Channel Stability

Sediment supply and vertical and lateral stability were assessed for each project-affected stream reach (PG&E and NID, 2011c). Of the 94 evaluated stream reaches affected by one or both projects, including the mainstems of the Middle and South Yuba Rivers, 68 had low sediment supply and little lateral or vertical instability. These stream reaches are stable in their current form and location due to bedrock control of bed and banks, and resistant parent material that is not easily eroded and provides limited quantities of sediment material; as a result, they are considered transport stream reaches (i.e., steep channels, dominated by non-depositional processes). Twelve of the remaining stream reaches had a moderate, intermittent sediment supply (i.e., short sections where banks are eroding occasionally, separated by long sections of banks that are not eroding), where some depositional characteristics occur.

Specific sediment inputs and/or stability issues were identified in 15 project-affected stream reaches, described below. These sediment sources are from local bank failures and upstream events such as erosion in project spill channels. Channel stability analysis was also performed for 6 of 15 of these stream reaches (PG&E and NID, 2011b). These six stream reaches with data to evaluate channel stability are more fully described below for specific sediment sources: Fordyce Creek below Fordyce Lake dam (Drum-Spaulding Project), Bear River reach #2 above Drum afterbay (Meadow sub-reach; Drum-Spaulding Project), Middle Yuba River below Jackson Meadows dam (Yuba-Bear Project), Canyon Creek below Faucherie Lake dam (Yuba-Bear Project), Canyon Creek below Bowman-Spaulding diversion dam (Yuba-Bear Project), and Bear River below Dutch Flat afterbay dam (Yuba-Bear Project). The type and location of erosion and deposition in the channel and within the riparian zone and the ability of the channel to withstand lateral or vertical movement were used to assess bank and channel stability.

Drum-Spaulding Project

Texas Creek Below Lower Rock Lake Dam (Reach #1) (Spaulding No. 3 Development)—Lower Rock Lake dam stream reach is a 3.6-mile-long section of Texas Creek between Lower Rock Lake dam (elevation 6,622 feet msl) and Lindsey Creek (elevation 5,800 feet msl). The channel is shallow and mostly confined between moderate slopes composed of non-cohesive glacial and colluvial material. Coarse boulder and smaller-sized material are stored in the main channel and the dynamic, somewhat narrow riparian zone vegetated by mountain alder. Just below Bowman Road, there is a 310-foot-long, 10-foot-high exposed and eroding bank from a Bowman Road failure. The stream has widened and split, but vegetative recovery is narrowing the exposed channel. The toe of the slope is somewhat protected by boulders and LWD with rootwads that protect the slope and store material. These eroding banks may be a source of spawning-sized gravels, because despite an average gradient of 5 percent, there are 65 square feet of spawning-sized gravel deposits (many stream reaches in the area lack any gravel deposits).

Fordyce Creek Below Fordyce Lake Dam (Spaulding No. 1 and No. 2 Development)—Fordyce Lake dam stream reach is a 10.5-mile-long reach between Fordyce Lake dam (elevation 6,400 feet msl) and Lake Spaulding (elevation 5,040 feet msl). About 78 percent of the channel has about a 1.8 percent gradient, but there are short sections at and above 4 percent. The channel flows through thinly vegetated mature forest and shrubs on granite bedrock. The granite bedrock is generally resistant to erosion, but

there are some sources of sand in the reach that have resulted in sandy deposits in the deeper sections of the channel. Most of the channel is entrenched within bedrock, and laterally and vertically stable due to boulder and bedrock control. There are short alluvial sections usually less than 0.2 mile long, where terraces and floodplains exist. These short alluvial sections are subject to erosion and incision, and there are 1,405 feet (50 percent of the alluvial section of channel) where one or both banks are exposed and bank erodibility hazard is high to very high, though channel stability is still fair. Undermined, vertical banks in the short alluvial sections are beginning to lie back at a more natural angle typical of undisturbed areas, and floodplains/point bars are forming within the previously incised channel. There are also remnant small, marginal sandy deposits within the more confined, bedrock-dominated sections that have been and continue to be degraded. The reach is used as a conveyance, currently transporting flows of 300 to 500 cfs during the summer months, when historical unregulated flows were at a minimum (e.g., 10 to 100 cfs). This sustained high flow during the summer months may have reduced the margin deposits because they occur during the growing season, are sustained the entire summer, and may have also created incision in the short alluvial sections.

Bear River Above Drum afterbay (Reach #1) (Spaulding No. 1 and No. 2 Development)—Bear River reach #1 extends 0.3 mile from Bear River at the point of inflow from Drum canal (measured at gage YB-137) (elevation 4,800 feet msl) to the point of inflow from South Yuba canal (measured at gage YB-139) (elevation 4,600 feet msl). Bear River reach #1 is dominated by boulders and cobble, and splits around a vegetated island above the Bowman-Spaulding Road bridge. At the bridge, the channel flows over bedrock, then through a vertically and laterally stable, planar, cobble/gravel channel for a short distance to the junction with the South Yuba canal inflow. Flows into Bear River reach #1 over the last 10 years have generally been below 400 cfs, although in 2006 there were sustained flows above 400 cfs.

Bear River Above Drum afterbay (Reach #2) (Spaulding No. 1 and No. 2 Development)—Bear River reach #2 extends 7.6 miles from Bear River at the point of inflow from South Yuba canal to Drum canal (Drum-Spaulding Project). This stream reach consists of two sub-reaches: the upper Meadow sub-reach is 2.3 miles long and extends from 4,600 to 4,480 feet msl elevation, and the lower Boardman sub-reach is 5.3 miles long and extends from 4,480 to 3,400 feet msl elevation. The Meadow sub-reach flows through a large meadow dominated by grasses and sedges with extensive willow and shrubs growing on the channel margin. The lower Boardman sub-reach flows through a mature forest and shrub community and includes the Zeibright Mine in the middle of the stream reach and the Pittman Spill in the lower part of the stream reach.

Peak flows that have moved through this stream reach are the result of major storm events and the periodic release of water from the project's Drum and South Yuba canals. Effects of releases may have caused or exacerbated channel incision and bank failures in the Meadow sub-reach above and below Highway 20. Observed regulated flows and synthesized unregulated flows indicate that releases through this reach have occasionally exceeded estimated peak unregulated values. Peak regulated flows for the past 30 years of record were often lower than unregulated high flows, but peak releases in excess of 100 cfs occurred with greater frequency. Under unregulated conditions, there would generally be little flow through this reach during the months of May through October, with periodic high flow events in November through April that rarely exceed 300 cfs, except in storm events. Under regulated conditions, there is a sustained 5 cfs minimum flow throughout the year (measured at YB-198), with frequent high winter and early spring flow events that generally do not exceed 400 cfs. Between 1993 and 1997, peak flows were higher, more frequent, and sustained longer than unregulated conditions, with six high flow events that ranged from just over 300 cfs to nearly 580 cfs. The higher sustained flows in 1997 were primarily due to the New Year's Day flood event, which sent a large pulse of sediment into Drum afterbay and incapacitated the hydroelectric powerhouses. The powerhouses were placed on an extended outage due to sedimentation; water diverted from NID's and PG&E's facilities in the Middle and South

Yuba River was subsequently diverted through Bear Valley and directly into Drum afterbay (typically, these flows would be moved into the Bear River watershed via Drum canal).

In the Meadow sub-reach, while there is evidence of active erosion in some locations (about 345 feet), most of the banks are recovering from the effects of grazing and high flows. The characteristics of the Meadow sub-reach differ slightly based on location, as described below.

In the Upper Meadow (top of reach to about Highway 20), the channel is slightly entrenched where intermittent floodplains exist, with potential for lateral adjustments through fine grained, though cohesive, sediment. Bank erosion hazard is high due to vertical, occasionally undermined banks in several locations where there is vegetative or root protection. The adjacent steep meadow slopes are significantly higher than the stream channel and appear to be supported by groundwater sources and not through hydraulic connection or overbank deposits from the river.

In the Middle Meadow (between Highway 20 and the Lower Meadow), there are indications of incision (e.g., exposed tree roots and vertical banks), and about 10 percent of the stream reach has recent erosion, such as block failures and slumping. The channel is entrenched, with little potential for lateral adjustments because banks are composed of a cobble-boulder berm/banks on one side and terrace slope with strong vegetative control on the other, and bank erodibility hazard is low. Vertical stability is controlled by immobile substrate. There is boulder and imbricated cobble material that limits any further vertical incision.

In the Lower Meadow (last half mile of the sub-reach), the channel is slightly entrenched, with potential for lateral adjustment through natural meandering. Following removal of livestock from the area, willows and other woody species have increased dramatically, as seen on historical aerial photos. Woody riparian vegetation has served to stabilize affected stream banks. Lateral movement of the stream through the meadow is limited by the incised nature of the channel and continuing growth of willows and sedges. Banks are becoming more vegetated, and the toes of the banks are often protected by vegetation or an incipient, inset floodplain. The outside of bends have experienced some bank failures, which is expected in a meandering stream, and the inside of the bends are often well-vegetated and have a resistant riparian zone with sedges, willows, and an active floodplain. There are aquatic plants, such as aquatic buttercup (*Ranunculus aquatilis*) that are growing thickly on low-gradient riffles, which have affected the mobility and size distribution of the gravels on the riffles.

In the Boardman sub-reach, the 1.3-mile-long channel is mostly transport-dominated and there is little erosion (1 percent). The reach is mostly laterally and vertically stable. An exception to this stability is the section between the Pittman spill at RM 28.8 and just above Drum powerhouse at RM 27.6, which was widened and disturbed due to the flood effects of the Pittman spill. The initial Pittman spill occurred in 1986 when the Drum siphon failed and 550,000 cubic yards of sediment were added to Bear River. A debris torrent of sediment and water widened the active channel considerably for about 1.2 miles. Restoration activities and monitoring have been implemented at the failure site since 1986. The channel is dominated by lateral and vertical bedrock controls except for the last 0.2 mile above Drum afterbay. Channel mobility analysis estimates that particles up to 11.2 inches are mobile at 455 cfs (2-year and 2.7-year regulated and unregulated return intervals, respectively) in at least a portion of the channel. Reach-averaged median grain size is 6.3 inches, and median regulated flow is 407 cfs. This indicates that particles greater than the median particle sizes are mobile, the channel bed will continue to coarsen, and transport capability likely exceeds sediment supply.

Yuba-Bear Project

Middle Yuba River Below Jackson Meadows Dam (Bowman Development)—Jackson Meadows dam stream reach is a 1.6-mile-long section of the Middle Yuba River that extends from Jackson

Meadows dam (elevation 5,900 feet msl) to the Milton diversion dam impoundment (elevation 5,700 feet msl). The surrounding area is mostly riparian forest on low terraces, with significant sections of unvegetated rocky slopes. There is an extensive wetland at the inflow to Milton diversion dam impoundment that captures sediment, and flow is distributed through numerous surface and sub-surface channels (i.e., about 3,600 feet of the 1.6-mile-long reach). Historical spillway erosion has resulted in cobble lag deposits, which affect about 1,800 feet of channel (i.e., 20 percent of the reach), and have created side channels through riparian forests. The channel has little potential for lateral and vertical adjustments in the sections of the stream that are steeper and confined. Along the lower section of the reach (285 feet long; 3 percent of the stream reach), a 10-foot-high exposed bank occurs where bank erodibility hazard is greater; an estimated 2,000 cubic yards of mixed sand/gravel material have been delivered to the channel. The unstable banks are due to non-cohesive lag deposits forming one bank (moderate bank erosion hazard) and erosion along the base of the terrace (extreme bank erosion hazard). Within this lower, unconfined section of channel adjacent to the exposed bank, the channel is slightly entrenched, with potential for lateral and vertical adjustments. Banks on one side are stable, vegetated, and part of the active floodplain; bank erosion hazard is very low to low in this area.

Jackson Creek Below Jackson Lake Dam (Bowman Development)—Jackson Lake dam stream reach is a 3.0-mile-long section of Jackson Creek that extends from Jackson Lake dam (elevation 6,585 feet msl) to Bowman Lake (elevation 5,580 feet msl). The surrounding area is mostly wooded hillslopes, with a meadow at the top of the reach near the outflow of Jackson Lake. About 27 percent of the reach is considered “unstable.” The lower 0.8 mile of the reach flows through unconsolidated debris fan deposits that resulted from a large rain-on-snow event in 1997. These deposits changed the course of Jackson Creek, which now flows through coarse boulder and finer, poorly sorted alluvial fan debris. The channel is exposed with little overhead cover or three-dimensional heterogeneity, and flow is interstitial through coarse substrate during the low-flow period. Banks are erodible, with little bank cohesiveness; 65 percent of the streambanks within this fan are actively eroding. Most of the sediment is trapped behind the Meadow Lake Road crossing that has two culverts to pass the water.

Canyon Creek Below Faucherie Lake Dam (Bowman Development)—Faucherie Lake dam stream reach is a 1.8-mile-long section of Canyon Creek that extends from Faucherie dam (elevation 6,132 feet msl) to Sawmill dam (elevation 5,863 feet msl). The surrounding area is mostly moderately vegetated mature forest and shrubs on gentle slopes. This channel is slightly entrenched in more-alluvial sections and moderately entrenched within steeper sections that are bounded by more resistant and steeper banks. The channel in the lower gradient, alluvial section has potential for lateral and vertical adjustments and is wider than expected given the drainage area, so further riparian widening is possible. Near the Faucherie Lake dam, there is little potential for adjustments within the steeper sections bounded by more resistant bed and banks. In the lower, more bedrock-controlled portion of the stream reach, the channel is moderately entrenched, with little potential for lateral and vertical adjustments, and bank erosion hazard is very low due to bedrock/boulder controls.

Uncontrolled spill from Faucherie Lake dam occurred 70 percent of the time (2,512 out of 3,584 days) from December 1999 to 2008; the eight highest spill discharges ranged from an estimated 430 cfs to just over 1,000 cfs and averaged about 600 cfs. The spill flow is not gaged, so the volumes were estimated based on height above spill crest. The spill channel has been eroded to bedrock, and little further erosion is expected, though there may be some gravel and sediment added from adjacent side slopes. Most of the erosion in the Faucherie Lake dam spillway channel occurred during the 1997 rain-on-snow event in Canyon Creek. The eroded spill channel is about 1,300 feet long (14 percent of the 1.8-mile-long reach). The storm flow passed through the riparian forest that is separated from the main channel for about 350 feet. Sediments transported from the spill channel are mostly stored in the side channel, but there are gravel deposits in the main channel that could have come from spill channel erosion. Erosion within the flood-flow channel in the riparian forest is restricted to the upper third of the

side channel; most of the material is re-deposited before the floodflow channel re-enters the main channel. Sediment from additional spill erosion would be transported to the junction with the main channel during the next spill event. There are currently deposits of trout spawning-sized gravel in the portion of the main channel bypassed by the flood-flow channel, indicating that some finer grained materials are entering the mainstem from upstream. Further significant spill erosion is considered unlikely.

Canyon Creek Below Bowman-Spaulding Diversion Dam (Bowman Development)—Bowman-Spaulding diversion dam stream reach is a 4.4-mile-long section of Canyon Creek that extends from the Bowman-Spaulding diversion dam (elevation 5,160 feet msl) to Texas Creek (elevation 4,640 feet msl). The upper half of the area is typified by exposed and thinly vegetated granite bedrock, while the lower half is more dense mature forest on steep side slopes. This channel is moderately entrenched, with banks and substrate somewhat deformable. Although the potential exists for dynamic bed and bank adjustment, the banks are fairly stable, composed of cobbles and reinforced with perennial riparian roots. The bank erodibility hazard is moderate to low, although there is some residual undermining of upper banks due to the large 1997 flood flows.

An emergency release of 20,000 cfs from Bowman reservoir in 1997 washed through the spill channel. Material was deposited above the junction with the main channel; some material extends into the main channel at the USGS flow gaging station and directly influences about 2,100 feet of channel (9 percent of the reach). Most of the gravel and finer sediment has subsequently been transported from this stream reach, though there are some gravel and cobble bars that are remnants of that spill and other localized inputs.

A dump gate at the outlet of the 84-inch reinforced concrete pipe downstream of tunnel #2 of the Bowman-Spaulding conduit was used to release high flows between 1997 and 2000, which created a 1,300-foot-long, 6- to 20-foot-wide channel down a steep slope to Canyon Creek, resulting in up to an estimated 1,400 cubic yards of material added to Canyon Creek above Texas Creek. There is some fine sediment stored in pools, with an average of 13 percent of the residual pool volume filled with fine sediment. Of the limited supply of trout spawning gravels, 2 to 15 percent is less than 0.08 inch. While both fine and coarse sediment were likely delivered from hillslope erosion associated with releases from the canals, most of the material appears to have been transported downstream through the active channel. Limited gravel and cobble bars, and some pool-tailout gravels, are all that remain in this transport-dominated stream reach as a result of these releases.

Clear Creek Below Clear Creek Diversion Gate (Spaulding No. 3 Development)—Clear Creek diversion gate stream reach is a short reach (0.9 mile) that extends from Bowman-Spaulding conduit (elevation 5,360 feet msl) to Fall Creek (elevation 5,200 feet msl). The surrounding area is mostly gently sloping terraces with harvested and mature timber. Side slopes are moderate and covered with mature forest and shrubs. A dump gate can be used to release water from the conduit into the creek. This practice has resulted in an eroded slope about 415 feet long and 10-20 feet wide. The slope supplies gravel, sand, and finer material directly to Clear Creek. Other than this localized input, the stream is laterally and vertically stable with no streambank erosion.

Fall Creek Below Fall Creek Diversion Dam (Spaulding No. 3 Development)—Fall Creek diversion dam stream reach is a 2.0-mile-long section of Fall Creek that extends from the Bowman-Spaulding conduit (elevation 5,320 feet msl) to the South Yuba River (elevation 3,200 feet msl). The surrounding area is mostly moderately dense mature forest on moderate to gentle slopes until the creek flows over thinly vegetated granite bedrock cliffs for the lower 1.2 miles. The channel below the Bowman-Spaulding conduit has widened and coarsened for about 300 feet (i.e., 3 percent of the entire stream reach) due to emergency releases from Bowman-Spaulding conduit during the 1997 flood. The main channel is composed of cobbles and boulders set within larger, immobile boulders. Willows have

colonized the exposed margins, and the vegetative recovery has begun to narrow the exposed area. Smaller releases occur occasionally to drain the conduit of residual water during outages. Exposed banks (i.e., 600 feet of a 0.8-mile-long reach; 14 percent of the non-bedrock portion of the stream reach) and upstream sources supply trout-spawning-sized gravels to the depositional part of the stream reach above the cliff section. The lower part of the stream reach is transport-dominated as it spills over bedrock cliffs, and storage of gravels is limited.

Trap Creek Below Trap Creek Diversion Gate (Spaulding No. 3 Development)—Trap Creek diversion gate stream reach is a 1.2-mile-long reach that extends from Bowman-Spaulding conduit (elevation 5,360 feet msl) to Fall Creek (elevation 3,600 feet msl). There is a 1,100-foot-long eroded section within the historical Trap Creek channel where emergency releases from the spill gate have created vertical, eroding banks by undermining the adjacent moderate slopes vegetated with mature forest and shrubs. The eroded section is within the upper 0.85 mile of the stream reach within glacial parent material and has a 13 percent gradient. The lower 0.35 mile flows over steep (57 percent gradient) resistant granite bedrock, adjacent to thinly forested steep slopes. This lower section is transport-dominated and has low, local sediment supply.

Bear River Below Dutch Flat Afterbay Dam (Chicago Park Development)—The Dutch Flat afterbay dam stream reach is the 5.4-mile-long section of the Bear River that extends from Dutch Flat afterbay (elevation 2,560 feet msl) to Chicago Park powerhouse (elevation 2,240 feet msl). The channel flows through and within multiple terraces that are composed of hydraulic mining debris. Terraces are thinly vegetated with some small conifers and low densities of shrubs and herbs. Hillslopes are steep and densely vegetated with mature trees and shrubs. Some willows and alders are becoming established along the channel margin, but these are often undermined by continuous erosion (high to extreme bank erodibility hazard). Streambanks are erodible and droughty due to the character of the mining sediment (coarse cobble to sand-sized material with few organics) that composes bed, banks, and terraces. Riparian growth and sediment deposition in the channel margin are poorly developed along many of the non-cohesive banks. There is some inset, incipient floodplain development along portions of the channel where bank erodibility hazard is lower. Overall, the channel is moderately entrenched, with potential for lateral and vertical adjustments. Boulders and bedrock knobs create pools and increase depth and channel heterogeneity, though these elements are rare. Particles of 2.75 inches (larger than trout spawning gravel) are estimated to be mobile at 128 cfs (1.8-year and 1.2-year regulated and unregulated return intervals, respectively), so it is likely that spawning-sized gravels are transported readily. There were few patches of trout-spawning gravels in the stream reach.

Bear River Below Chicago Park Powerhouse (Chicago Park Development)—The Chicago Park powerhouse stream reach is the 1.5-mile-long section of the Bear River that extends from Chicago Park powerhouse (elevation 2,240 feet msl) to Rollins reservoir (normal maximum water surface elevation of 2,171 feet msl). The braided stream reach consists of numerous shifting channels over a broad floodplain. There are willows and alders along the channel margin, but they are young and poorly resistant to flow stresses; a thinly vegetated shrub and herb layer is the dominant cover on the floodplain. Hillslopes are steep with moderately dense trees and shrubs. Streambanks are erodible and droughty as a result of high amounts of mining sediment that compose bed, banks, and terraces. About 2,200 feet of one or both banks of a 0.52-mile-long stretch is actively eroding (40 percent erosion). Riparian growth and sediment deposition in the channel margin are not supported along many of the non-cohesive banks, but there is some incipient and inset floodplain development along portions of the channel. Boulders and bedrock knobs create pools and increase depth and channel heterogeneity, though these elements are rare and the channel is mostly shallow and dominated by low-gradient riffles and glides.

Drum-Spaulling and Yuba-Bear Projects

Unnamed Tributary Below Fuller Lake Dam (Spaulding No. 1 and No. 2 Development)—Fuller Lake dam stream reach is a 1-mile-long unnamed drainage that extends from Fuller Lake (elevation 5,320 feet msl) to Jordan Creek (elevation 4,600 feet msl). The area is typified by fairly steep slopes with mature forest until the lower 0.2 mile, which is thinly vegetated, steep (over 30 percent) granite bedrock. This stream reach receives spills from Fuller Lake through an automatic siphon when the lake is too full or due to a plugged trash rack. There are about 1,000 feet of 2- to 6-foot-high vertical exposed and eroding banks within 4,200 feet of stream (12 percent of the stream reach) downstream of the lake before the stream flows over the resistant bedrock cliff to Jordan Creek. Though not gaged, Fuller Lake was very high during the 1997 flood event; incision is likely due to spill from this event. There is no sediment plume or fan at the junction with Jordan Creek, so it appears that sediment input has not been significant and/or there has been sufficient flow in Jordan Creek to transport the added sediment. Stream-side trees are being undermined and added to the active channel, and provide LWD to Fuller Lake dam stream reach, which stores sediment and provides roughness to reduce erosive energy.

Jordan Creek Below Jordan Canal Diversion Dam (Spaulding No. 1 and No. 2 Development)—Jordan Creek diversion, on Jordan Creek, is a pond with a surface area of 0.01 acre and a gross storage capacity of less than 0.1 acre-feet, impounded by a dam, a masonry structure 3 feet high. Jordan Creek canal from the Jordan Creek diversion impoundment consists of a 0.07-mile-long flume and a 0.53-mile-long natural waterway discharging into Lake Spaulding. The area is typified by fairly steep slopes surrounded by densely wooded mature forests. Based on photography provided in the amended final license application, some sediment and debris has accumulated behind the diversion dam. No information was provided on the physical status of the canal; however, the amended final license application states that both the diversion dam and the canal have not been operated for many years and are not necessary for current or future operations.

Jordan Creek diversion dam stream reach is short (1.6 miles) and extends from the Jordan Creek diversion dam (elevation 5,200 feet msl) to the South Yuba River (elevation 4,480 feet msl). The stream reach consists of two sub-reaches: the upper sub-reach is a steep, transport section that flows through densely wooded mature forests on steep slopes, while the lower sub-reach is a wide, glacially formed valley with a few hardwoods within the valley floor bounded by a thin mixed forest on adjacent steep valley slopes. The lower glacial valley has also been affected by large spills from Lake Spaulding spill channel. The spills have scoured the glacial valley for about 1 mile, where substrate is boulder sized, flow is interstitial, and alluvial processes are dominated by high-energy spill-flow. The largest four spill events were in 1986, 1996, 1997, and 2007; instantaneous peaks measured in the South Yuba River at Lang's Crossing (includes flow from spill events that travel through Jordan Creek and direct releases from Lake Spaulding) ranged from 20,400 cfs to over 34,000 cfs. The active and surface-flow portion of the channel in the lower one-third of the lower sub-reach is about 10 to 30 feet wide in a valley that is 140 to 235 feet wide. There are vertical eroding banks/valley walls for about 3,000 feet, though eroded material from this potential source of sediment is not evident in the channel.

Large Woody Debris (LWD)

LWD consists of trees and woody material that fall into the active stream channel and floodplain that can be mobilized during high flow events and provide structure that can enhance channel morphology and aquatic habitat. PG&E and NID evaluated the quantity and diversity of LWD in selected project-affected reaches. All pieces of wood (dead or dying) lying within the bankfull width of the channel were counted if they measured one-half bankfull width or longer. Only downed wood with a portion lying within the bankfull channel was recorded. Individual pieces were separated into size classes based on diameter and total length. The diameter size classes were: 6 to 12 inches, 12 to 24 inches, 24 to

36 inches, and greater than 36 inches. The length size classes were: 3 to 10 feet, 10 to 25 feet, 25 to 50 feet, 50 to 75 feet, and greater than 75 feet. The number of pieces of LWD found within the channel width that was wetted during the assessment was a separate category, essentially a sub-set of the total number of pieces found within the bankfull width (PG&E and NID, 2011c).

The steep and confined channel network in project-affected stream reaches offers limited opportunity for LWD retention and long-term sediment storage within the bankfull channel perimeter. Sierra Nevada streams have been found to have mean LWD piece frequency ranging from 9.5 to 24.6 pieces per 100 meters (153-396 per mile), with a median value of 27 pieces per mile. However, 48 project-affected streams in which LWD was counted had a range of 0-307 pieces per mile. Based on the estimated volume of wood removed from project reservoirs where records are kept, the range was 0.0002 to 0.03 cubic meters per hectare (0.02 to 2.6 cubic feet per acre). This volume is based on truckloads removed and drainage area above the reservoir. Mean volume of LWD observed in Sierra Nevada streams ranged from 36 to 320 cubic meters per hectare (3,141 to 27,924 cubic feet per acre). Therefore, it appears the project-affected stream reaches have much less volume of LWD in the channels than was found in other parts of the Sierra Nevada, and significant amounts of debris are not being stored in the reservoirs. There may be more wood sinking or stored in locations other than the channel (e.g., above mean high water line in the reservoirs), so the volume collected from the reservoirs may be a conservative estimate. The exception to low amounts of LWD transported to reservoirs was in the Bear River during the 1986 and 1997 floods when Drum afterbay was filled with trees. The amount was not quantified, but existing in-channel wood in the stream reach above Drum afterbay (Bear River reach #2) is estimated to be 24 pieces per mile; therefore, this amount was likely greater during the storm events. None of the other Bear River stream reaches or diversions had significant amounts of wood, so there may have been more streamside trees that were undermined and transported in this stream reach, particularly during these flood events, compared to the other stream reaches.

3.3.1.2 Environmental Effects

3.3.1.2.1 Slope Stability and Erosion

Drum-Spaulding Project

Erosion and Sediment Control and Management and Slope Assessment and Facility Access

Project operations and recreational usage of project facilities have the potential to cause or exacerbate local erosion; resulting slope failure and turbid runoff can result in impaired water quality. Steep slopes or channels affected by planned or emergency discharges from project canals and conduits are particularly at risk. Heavy use, maintenance, and construction activities at project facilities and recreation areas also create opportunities for erosion and runoff to project-affected waters.

Forest Service condition 27 and BLM condition 50 specify that PG&E consult with those agencies to develop an Erosion and Sediment Control and Management Plan. This plan would provide guidance and establish procedures for treating erosion sites and controlling sedimentation at existing project and project-affected areas on lands managed by the Forest Service and BLM. Measures and procedures for erosion control during new construction and non-routine maintenance would be included in the plan. The plan would include: (1) initial and periodic inventory and monitoring of erosion sites; (2) criteria for prioritizing and ranking erosion sites for treatment; (3) identification of a list of standard control measures consistent with Forest Service and BLM regulations that can be customized to site-specific conditions; (4) development of a schedule for treatment (e.g., repair, mitigate, monitor) of identified prioritized erosion sites; (5) monitoring effectiveness of completed erosion control treatment measures and rescheduling further treatment, as necessary; (6) establishing protocols for emergency erosion and sediment control; and (7) developing a process for documentation and reporting inventory,

monitoring, and treatment projects and results with geographic information system (GIS) database mapping capability.

Forest Service condition 26 and BLM condition 19 specify that PG&E develop a Slope Assessment and Facility Release Access Plan to address erosion potential at discharge points from project facilities including past canal breaches. The plan would include: (1) assessment of landslide hazards for slopes above and below project facilities and conducting slope stability analysis at sites that are moderately to highly unstable; (2) assessment of erosive conditions at sites affected by past canal breaches and recommendation for repair of these sites; (3) assessment of conditions at penstocks and other project drainage facilities used as emergency and maintenance release points, and recommended improvements to these facilities that would minimize potential erosion and adverse impacts to resources associated with their operation; and (4) proposed measures to reduce risk of slope failure associated with project facilities and operations.

California Fish and Wildlife made two resource recommendations (measures 11 and 22) and two administrative conditions (conditions 27 and 28) related to erosion control and management both project-wide and specifically related to steep slopes below penstocks, open canals, and other project drainage structures. Measure 11 would require PG&E to submit an approved plan to minimize adverse resource effects associated with releases for penstocks and other maintenance and emergency drainage structures. Measure 22 recommends that PG&E implement project-wide erosion control and sediment management procedures and practices that are the same as those specified by Forest Service condition 27 and BLM condition 50. California Fish and Wildlife condition 27 recommends that PG&E develop a plan to assess the stability and hazard of steep project-affected slopes that is the same as that proposed by Forest Service condition 26 and BLM condition 19. California Fish and Wildlife condition 28 would require PG&E to submit an approved Watershed Restoration Plan that would include: a description of steep slopes and project drainage structures where damage has occurred, as would be developed in its measure 11 and condition 27; locations where future damage could occur; measures and schedules for restoration of damaged slopes; a schedule for inspection of sites; and a process for notifying the Forest Service of damage to resources.

PG&E filed (August 30, 2012) an alternative condition that would combine the two Forest Service conditions (26 and 27) and the two BLM conditions (19 and 50). PG&E would implement the detailed Erosion Control and Slope Maintenance Plan submitted on August 29, 2012. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

The PG&E plan includes an inventory and periodic follow-up monitoring of potentially significant project-related erosion and sedimentation sites. Priority sites would be identified and studied for potential treatment options. The plan presents standard methods and BMPs to minimize erosion during project operations and maintenance. PG&E would adhere to local, state, and federal erosion control planning and permitting processes, along with internal BMPs. In addition, the plan provides for periodic review and update of the plan with the Forest Service, BLM, and other appropriate agencies.

PG&E's plan establishes measures to manage and repair steep slopes potentially affected by drainage from project facilities for emergency and routine maintenance including: (1) an inventory of existing project canal spillways and release points with the potential to cause significant erosion and sedimentation on NFS lands; (2) periodic monitoring of target release points; (3) detailed study of those release points determined through implementation of the plan as "priority" risks and assessment of treatment options; and (4) adherence to local, state, and federal erosion control planning and permitting processes, along with internal BMPs. In addition, the plan provides for periodic review and update of the plan with the Forest Service, BLM, and other appropriate agencies.

Our Analysis—Project operations and maintenance have the potential to expose project and project-affected lands to erosion and sedimentation. Relicensing surveys indicate that stream reaches characterized by channel and bank instability are relatively limited in project-affected reaches (section 3.3.1.1.3, *Channel Stability*). Particularly in upper elevation portions of the project area, stream reaches are confined, vertically and horizontally, by bedrock and relatively immobile boulder substrate and banks. Areas identified with high instability and erosion potential are typically associated with steep, rugged terrain above and below project facilities (e.g., canals and conduits); these areas can be particularly vulnerable sites where historical emergency and severe event spills have occurred causing riparian damage and eroded stream channels.

A plan detailing measures, protocols, monitoring, and restoration procedures would facilitate control and management of project-related erosion and sedimentation for a project with the geographic scope of the Drum-Spaulding Project and remoteness of many project facilities and ensure effective protection, mitigation, and enhancement of Forest Service and BLM managed resources.

Forest Service, BLM, and California Fish and Wildlife conditions and recommendations outline general tasks to be included in the plan, guidelines for the types of information to be collected and monitored, and objectives for maintenance and restoration of resources affected by erosion and sedimentation. The agencies specify that PG&E periodically review and update the plan. The agency conditions do not identify a specific plan, but specify that PG&E develop the plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and SWRCB for implementation within 1 year of license issuance.

PG&E's Erosion Control and Slope Maintenance Plan addresses and integrates all of the primary issues and concerns identified by the Forest Service, BLM, and California Fish and Wildlife under a single comprehensive plan. The plan includes details of the scope and methods for inventory and prioritization of erosion sites and slopes at risk due to project operations and maintenance. Emergency and routine spillway and release points from project canals are identified in the plan. Methods for evaluation of priority sites and development of design alternatives for repair, restoration, or mitigation of these sites and scheduling implementation of selected designs are also included. Specific measures are presented to address slope stability in the vicinity of project water conveyance structures, canal spillway operations, emergency operations, and new construction. Each of the itemized objectives listed in the agencies' conditions are incorporated into the objectives of the PG&E plan. PG&E's proposed implementation schedule is to complete the inventory and prioritization of sites, study of priority sites, and development of design recommendations within 3 years of license issuance. Final designs to minimize and prevent future erosion and sedimentation damage at each of these sites including an implementation schedule would be developed in consultation with the agencies. General procedures are outlined to address planned erosion treatment programs and those implemented to stabilize and mitigate emergency situations. Erosion issues specific to individual resource plans are addressed in appropriate detail within those plans (e.g., HPMP, Recreation Plan). The plan itemizes the local, state, and federal permits that would be necessary for various types of treatment actions and provides a process flow chart decision train to categorize the type of action and approvals necessary for a specific action (figure 3-2).

Implementation of the plan at all project-affected lands regardless of whether they are under the jurisdiction of the Forest Service or BLM would minimize the potential for erosion associated with project operations and maintenance and would provide a mechanism for ongoing assessment of project facilities and implementation of appropriate prevention and restoration measures. Agency consultation, as needed, would ensure that erosion control and restoration measures implemented on federal lands are consistent with agency guidelines.

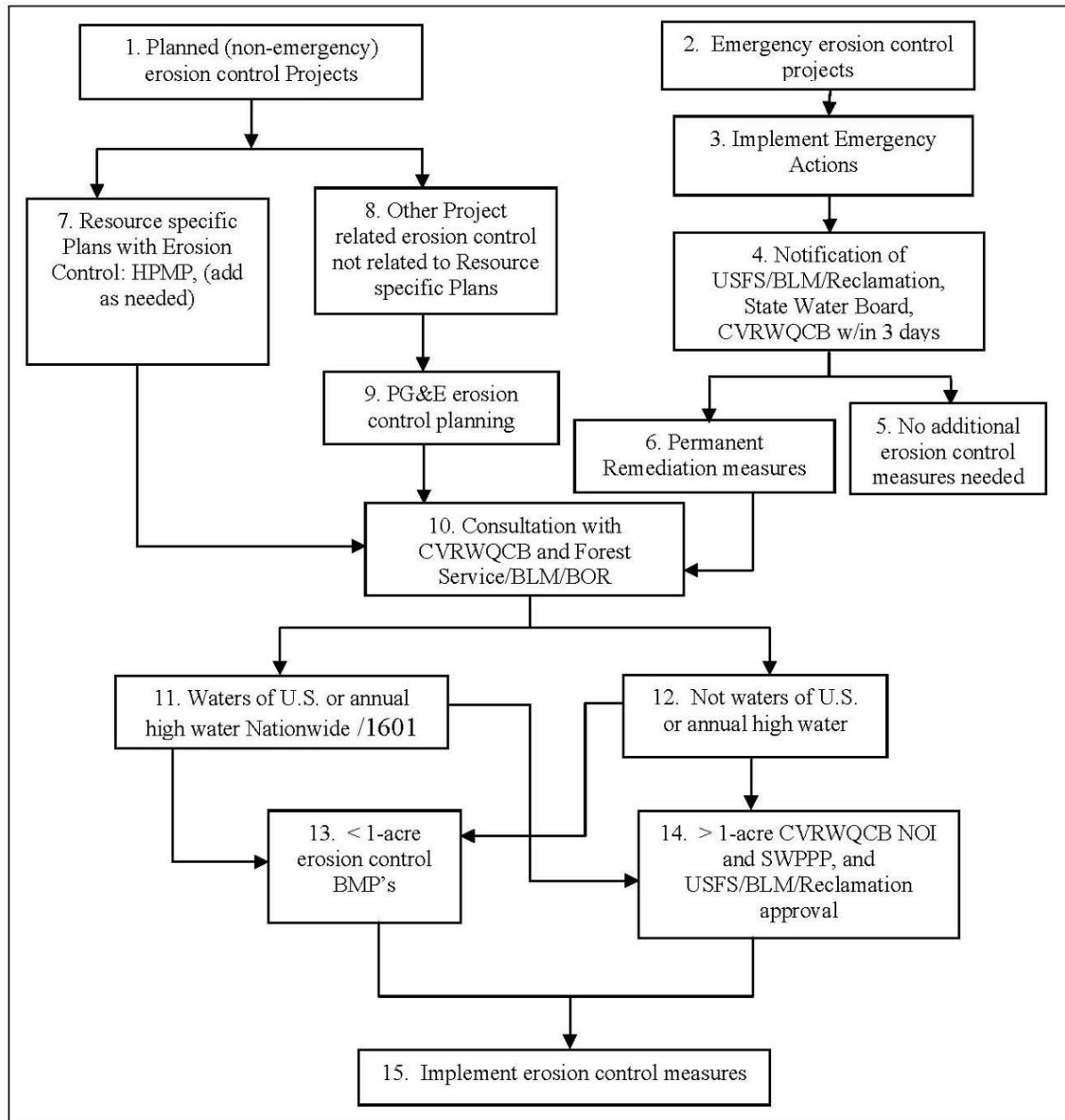


Figure 3-2. Erosion and Sediment Control Plan process flow chart. (Source: PG&E, 2011a; NID, 2011a)

Decommissioning of the Jordan Creek Diversion and Jordan Canal

PG&E proposes the decommissioning of the Jordan Creek diversion dam and Jordan canal, but did not provide a decommissioning plan or an evaluation of environmental effects in its application. Removal or deconstruction of the Jordan Creek diversion and Jordan canal could cause or exacerbate local erosion; resulting slope failure and turbid runoff can result in impaired water quality.

Our Analysis—Ground disturbance during deconstruction of the Jordan Creek diversion dam and Jordan canal could result in erosion, turbid runoff, and sedimentation in project-affected waters, including Lake Spaulding, Jordan Creek, and the South Yuba River. Development of a detailed Decommissioning Erosion Control and Restoration Plan for the removal of the Jordan Creek diversion dam and canal would ensure adequate restoration of the disturbed area. Any plan should detail measures, protocols, and monitoring procedures that would facilitate control and management of deconstruction-related erosion and sedimentation and ensure effective protection, mitigation, and enhancement of Forest Service and BLM managed resources.

Yuba-Bear Project

Erosion and Sediment Control and Management and Slope Assessment and Facility Access

Project operations and recreational usage of project facilities have the potential to cause or exacerbate local erosion; resulting slope failure and turbid runoff can result in impaired water quality. Steep slopes or channels affected by planned or emergency discharges from project canals and conduits are particularly at risk. Heavy use, maintenance, and construction activities at project facilities and recreation areas also create opportunities for erosion and runoff to project-affected waters.

Forest Service condition 27 and BLM conditions 41 specify that NID consult with those agencies to develop an Erosion and Sediment Control and Management Plan. This plan would provide guidance and establish procedures for treating erosion sites and controlling sedimentation at existing project and project-affected areas on lands managed by the Forest Service and BLM. Measures and procedures for erosion control during new construction and non-routine maintenance would be included in the plan. The plan would include: (1) initial and periodic inventory and monitoring of erosion sites; (2) criteria for prioritizing and ranking erosion sites for treatment; (3) identification of a list of standard control measures consistent with Forest Service and BLM regulations that can be customized to site-specific conditions; (4) development of a schedule for treatment (e.g., repair, mitigate, monitor) of identified prioritized erosion sites; (5) monitoring effectiveness of completed erosion control treatment measures and rescheduling further treatment, as necessary; (6) establishing protocols for emergency erosion and sediment control; and (7) developing a process for documentation and reporting inventory, monitoring, and treatment projects and results with GIS database mapping capability.

Forest Service condition 26 and BLM condition 25 specify that NID develop a Slope Assessment and Facility Release Access Plan to address erosion potential at discharge points from project facilities including past canal breaches. The plan would include: (1) assessment of landslide hazards for slopes above and below project facilities and conduct slope stability analysis at sites that are moderately to highly unstable; (2) assessment of erosive conditions at sites affected by past canal breaches and recommendation for repair of these sites; (3) assessment of conditions at penstocks and other project drainage facilities used as emergency and maintenance release points, and recommended improvements to these facilities that would minimize potential erosion and adverse impacts to resources associated with their operation; and (4) proposed measures to reduce risk of slope failure associated with project facilities and operations.

California Department of Fish and Wildlife recommended that NID develop and implement a Slope Stability Plan (recommendation 27) and a Watershed Restoration Plan (recommendation 28).

NID filed alternative conditions that would combine the two Forest Service conditions (26 and 27) and the two BLM conditions (25 and 41). NID would implement the detailed Erosion Control and Slope Maintenance Plan submitted on August 29, 2012. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

The NID plan includes an inventory and periodic follow-up monitoring of potentially significant project-related erosion and sediment sites. NID would identify and study priority sites for potential treatment options. The plan presents standard methods and BMPs to minimize erosion during project operations and maintenance. NID would adhere to local, state, and federal erosion control planning and permitting processes, along with standardized NID BMPs. In addition, the plan provides for periodic review and update of the plan with the Forest Service, BLM, and other appropriate agencies.

NID's Plan establishes measures to manage and repair steep slopes potentially affected by drainage from project facilities for emergency and routine maintenance including: (1) an inventory of existing project canal spillways and release points with the potential to cause significant erosion and sedimentation on Forest Service and BLM land; (2) periodic monitoring of target release points; (3) detailed study of those release points determined through implementation of the plan as "priority" risks and assessment of treatment options; and (4) adherence to local, state, and federal erosion control planning and permitting processes, along with internal BMPs. In addition, the plan provides for periodic review and update of the plan with the Forest Service, BLM, and other appropriate agencies.

Our Analysis—Project operations and maintenance have the potential to expose project and project-affected lands to erosion and sedimentation; steep, rugged terrain above and below project facilities, especially canals and conduits, can be particularly vulnerable sites. A plan detailing measures, protocols, and monitoring procedures would facilitate control and management of project-related erosion and sedimentation for a project with the geographic scope of the Yuba-Bear Project and remoteness of many project facilities and ensure effective protection, mitigation, and enhancement of Forest Service and BLM managed resources.

The Forest Service and BLM conditions outline general tasks to be included in the plan, guidelines for the types of information to be collected and monitored, and objectives for maintenance and restoration of resources affected by erosion and sedimentation. The agencies require NID to periodically review and update the plan. The agencies' conditions do not propose a specific plan, but require NID to develop the plan in consultation with Forest Service, BLM, California Fish and Wildlife, and California Water Board for implementation within 1 year of license issuance.

NID's Erosion Control and Slope Maintenance Plan addresses each of the primary issues and concerns identified by the agencies' conditions. The plan details the scope and methods for inventory and prioritization of erosion sites and slopes at risk due to project operations and maintenance. Emergency and routine spillway and release points from project canals are identified in the plan. Methods are presented for evaluation of priority sites and development of design alternatives for repair, restoration, or mitigation of these sites and scheduling implementation of selected designs. Measures specifically address slope stability in the vicinity of project water conveyance structures, canal spillway operations, emergency operations, and new construction. Each of the itemized objectives listed in the agencies' conditions are incorporated into the objectives of the NID plan. NID's proposed implementation schedule would complete the inventory and prioritization of sites, study of priority sites, and development of design recommendations within 3 years of license issuance. Final designs to minimize and prevent future

erosion and sedimentation damage at each of these sites, including an implementation schedule, would be developed in consultation with the agencies. General procedures are outlined to address: (1) planned erosion treatment programs; and (2) those implemented to stabilize and mitigate emergency situations. Erosion issues specific to individual resource plans are addressed in appropriate detail within those plans (e.g., HPMP, Recreation Plan). The plan itemizes the local, state, and federal permits that would be necessary for various types of treatment actions and provides a process flow chart as a decision train to categorize the type of action and approvals necessary for a specific action (figure 3-2).

Implementation of the plan at all project-affected lands regardless of whether they are under jurisdiction of the Forest Service or BLM would minimize the potential for erosion associated with project operations and maintenance and would provide a mechanism for ongoing assessment of project facilities and implementation of prevention and restoration measures. Agency consultation, as needed, would ensure that erosion control and restoration measures implemented on federal lands are consistent with agency guidelines.

Rollins Powerhouse Upgrade

Upgrading the Rollins powerhouse with construction of a second generation unit could result in increased erosion during excavation, construction, and other ground-disturbing activities. NID proposes to develop and implement a Construction Erosion Control and Restoration Plan specific to the Rollins upgrade (measure YB-G&S1). Following the Commission's approval of the Rollins upgrade in the new license, NID would prepare detailed design and construction plans and select a contractor to construct the upgrade. The Construction Erosion Control and Restoration Plan would then be prepared to specifically control and manage erosion based on the selected contractor's construction approach and site plan. The plan would be submitted 90 days prior to the scheduled start of construction on the Rollins upgrade and would provide a 30-day period for agency review.

Our Analysis—Ground disturbance during construction of the Rollins upgrade could result in erosion, turbid runoff, and sedimentation in project-affected water including Rollins reservoir, Bear River, and Bear River canal. NID's proposed Construction Erosion Control and Restoration Plan following license issuance, in conjunction with preparation of detailed construction plans for the Rollins upgrade when the project is prepared to move forward, would prevent erosion during construction of the Rollins upgrade and ensure adequate restoration of the disturbed area.

Recreation Facility Erosion Control

Construction, maintenance, and intensive use at project recreation facilities could result in erosion from disturbance of vegetation and soil and general wear. In order to prevent project-related erosion impacts, NID proposes to develop and implement a recreation facilities construction erosion control and restoration plan (YB-G&S2) at least 90 days prior to initiating construction at any recreation facility. NID submitted a plan for operational maintenance and rehabilitation of recreation facilities (Recreation Facilities Plan), which is discussed in detail in section 3.3.5.2, *Recreational Resources, Environmental Effects*. Small erosion control projects at recreation facilities could be performed under the project-wide Erosion Control and Slope Maintenance Plan discussed above; however, significant construction projects at recreation facilities would require preparation of a plan specific to that construction effort and become part of the construction plan.

Our Analysis—Construction and maintenance of recreational facilities could result in erosion associated with site disturbance and potential discharge of turbid runoff to project-affected waters. Implementation of a detailed Construction Erosion Control and Restoration Plan, as proposed by NID, would minimize the potential for erosion impacts. The plan would use standardized specifications and site-specific modifications for design and location of erosion control measures and BMPs and would

establish a schedule for compliance monitoring and inspections during site work to ensure that design plans are adequate and implemented appropriately. Agency consultation would ensure that erosion control and restoration measures implemented on federal lands are consistent with agency guidelines and meet permitting requirements.

3.3.1.2.2 Habitat Restoration

Drum-Spaulding Project

Bear Valley Meadow Reach of Bear River Upstream of Drum Afterbay

Aquatic and riparian habitat in Bear Valley Meadow has been affected by project operation and maintenance of Drum canal and former non-project agricultural uses. Of particular concern are fluctuations and sharp increases in flow through the stream reach that result from operations and maintenance of Drum canal. Under terrestrial resources, PG&E proposes to assess, manage, and restore habitat conditions in the Bear River between Bear Valley meadow and Drum afterbay (DS-TR4) (section 3.3.2.2.1, *Riparian and Wetland Vegetation*). Forest Service submitted condition 34 to assess baseline and ongoing conditions on Forest Service lands implementing qualitative and quantitative methods. The Forest Service [recommendation 10(a) 5] and California Fish and Wildlife [recommendation 10(j) 7, part 6] recommend measures to limit and manage spills from Drum canal upstream of Forest Service lands during winter and planned outages. PG&E did not submit an alternative to Forest Service condition 34, accepting the proposed Forest Service condition. The Forest Service recommendation was the result of negotiations among PG&E and relicensing stakeholders to resolve differences in the scope of the various plans.

The Forest Service and California Fish and Wildlife include a baseline evaluation of existing conditions in the stream reach to document conditions including channel and floodplain morphology, substrate/sediment conditions, bank stability and erosion, and riparian vegetation. Baseline surveys would include use of level loggers to determine a stage-discharge relationship at three locations in Bear River meadow and establishment of up to five monumented cross-section transects to document bed and bank profiles and position. Based on the results of the baseline surveys, continuing qualitative monitoring (visual and photographic documentation) would be implemented in selected erosion-prone areas and quantitative monitoring of conditions at the monumented cross-section transects. During the first 5 years following license issuance, the surveys would be conducted annually and in conjunction with 400 cfs or greater discharge events measured at YB-198, upstream of Drum afterbay. After 5 years of monitoring, survey frequency would be reduced to 3-year intervals and following event flows greater than 400 cfs. PG&E would prepare an annual report following each survey year summarizing the results and providing recommendations in collaboration with the Forest Service for subsequent monitoring surveys. The reports would identify locations of project-related adverse effects, if any, and recommendations for remediation of areas damaged as a result of project operations. Potential economic effects of recommendations on power generation and water supply would be provided in the reports.

PCWA (September 14, 2012) points out differences and recommends rejection of language in the California Fish and Wildlife recommendation that is not consistent with Forest Service condition 34 and fails to take into account water supply issues associated with water delivery via Drum canal and Bear River.

Our Analysis— Bear River channel and riparian zone have historically been affected by both project operations and maintenance and non-project land use activities related to agriculture and cattle grazing. With the information available, it is difficult to differentiate the effects of these project and non-project stressors on channel morphology and stability and aquatic and riparian habitat quality in this stream reach. PCWA (September 14, 2012) presents qualitative evidence that the channel location has

been stable since the late 1930s, channel erosion and down-cutting are minimal despite project operations, and riparian vegetation and habitat are recovering from grazing impacts. PCWA points to re-establishment of riparian vegetation subsequent to prohibition of cattle grazing in the Bear River meadow portion of the stream reach.

PG&E and the relicensing stakeholders have proposed a plan that would generate quantitative baseline data to assess project-related effects in this stream reach and ongoing monitoring to measure changes to stream channel and riparian conditions over time and specifically in response to high flow conditions associated with project operations. Channel morphology and substrate surveys at fixed transects would provide data to evaluate changes over time and response to specific high flow events. Locations exhibiting erosion and bank stability issues would be photographically documented for evaluation of changes over time and response to high flow events. The plan details data requirements and establishes a mechanism for annual review, evaluation, and recommendations for alleviation of project-related effects in this stream reach. If these studies indicate that project-related effects on the stream reach are minimal or have been mitigated, the annual consultation process provides a mechanism to recommend reduction or eventual elimination of this measure. Interim measures proposed to manage operational spills from Drum canal that result in rapid changes and high flows through this reach of Bear River (section 3.3.2.2.3, *Canal Outage Effects on Instream Flow*) would reduce effects that may be occurring under the existing license until the results of the proposed baseline and spill event studies provide adequate information to determine if and where further mitigation should be recommended. Implementation of the plan would ensure protection of the Bear River channel and riparian zone upstream of the Drum afterbay.

Yuba-Bear Project

Clear and Trap Creek Channel Stabilization

Clear and Trap Creeks are tributaries to Fall Creek and, under existing conditions, all flow from their upper watersheds is diverted into the Bowman-Spaulding canal. Operation and maintenance of the Bowman-Spaulding canal result in occasional pulsed discharges from the canal spill gates that have caused channel instability, bank failure, and erosion of Clear and Trap Creeks between the canal and Fall Creek. Canal releases have also incised a gully into the hillslope below the canal at the Christmas Tree wasteway to Clear Creek.

Forest Service condition 34 and California Fish and Wildlife recommendation 7, Part 10 specify that NID develop and implement a channel stabilization plan within 1 year of license issuance, but provided no detail of what the plan should include. NID filed an alternative condition that would require NID to implement the Clear and Trap Creeks Channel Stabilization Plan filed on August 29, 2012.

NID's proposed Clear and Trap Creeks Channel Stabilization Plan included in the amended license application provides a detailed phased program to assess existing conditions and develop conceptual alternative measures for restoration of three stream reaches: Clear Creek, Christmas Tree wasteway, and Trap Creek below the Bowman-Spaulding canal (YB-G&S3). NID proposes to complete the proposed work within 5 years of license issuance. The relicensing survey of Clear and Trap Creeks identified the extent of channel degradation and appropriate stream reaches for restoration. NID developed conceptual restoration design alternatives and construction sequencing including estimated costs.

Our Analysis—Historical operations of the Bowman-Spaulding canal have caused erosion and destabilization of the channels of Clear and Trap Creeks downstream of the canal. Ongoing bank failure and erosion extend over much of the respective stream reaches downstream to Fall Creek and are likely to continue disrupting aquatic habitat and potentially degrading water quality without intervention.

Implementation of NID's comprehensive plan for restoration of the degraded channels of Clear Creek, Trap Creek, and Christmas Tree wasteway would adequately mitigate past damage and protect these stream reaches in the future. Agency review and consultation, detailed construction plans, and environmental permitting would ensure protection of resources during restoration construction activities.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

3.3.2.1.1 Water Quantity

The Drum-Spaulding Project includes 29 reservoirs, 6 major water conduits, 12 powerhouses with associated switchyards, 6 transmission lines, 1 distribution line, and appurtenant facilities and structures. The Yuba-Bear Project includes 11 reservoirs, 4 major water conduits, 4 powerhouses with associated switchyards, 1 transmission line, and appurtenant facilities and structures. The following section describes key information regarding each reservoir and impoundment, grouped by project development. Physical characteristics of each reservoir, forebay, and afterbay are summarized in table 3-5.² Figures 3-3 through 3-16³ show historic trends in seasonal storage for each reservoir. In their license applications, PG&E and NID use the term unimpaired to refer to flow conditions without project dams, diversions, and powerhouses; that is, these represent hydrology under unregulated conditions. We use the term unregulated in this document to refer to flows that would exist if the project, project facilities, and water delivery systems did not exist.

Drum-Spaulding Project

Water Storage

Spaulding No. 3 Development

Upper Rock Lake

Upper Rock Lake has a maximum surface area of 19.8 acres, is 0.3 mile long, and has a maximum storage capacity of 275 acre-feet (usable storage is 207 acre-feet). Historical monthly storage for the period of record (water years 1976-2008)⁴ is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-6. Maximum drawdown occurs in October or November. The reservoir shoreline is 0.9 mile long. Upper Rock Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, this reservoir has minimal carryover storage. The drainage area into Upper Rock Lake is 0.18 square mile and is unregulated. The reservoir does not have any major tributaries contributing inflow. Water is normally released from Upper Rock Lake to Lower Rock Lake via the Upper Rock Lake dam spillway and a low-level outlet tunnel to Texas Creek.

² The tables referenced in section 3.3.2.1, *Aquatic Resources, Affected Environment*, are provided in appendix A-1.

³ The figures referenced in section 3.3.2.1, *Aquatic Resources, Affected Environment*, are provided in appendix B-1.

⁴ The historical period of record for streamflow and reservoir storage data is water years 1976 through 2008. A water year begins on October 1 and ends the following September 30.

Lower Rock Lake

Lower Rock Lake has a maximum surface area of 7.6 acres, is 0.2 mile long, and has an unknown maximum storage capacity (usable storage is 48 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-7. Maximum drawdown occurs in October or November. The reservoir shoreline is 0.4 mile long. The drainage area into Lower Rock Lake is 0.29 square miles, with the majority of inflows regulated by local accretion and releases from Upper Rock Lake. Lower Rock Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall months to augment storage in Lake Spaulding. Similar to Upper Rock Lake, there is minimal carryover storage in Lower Rock Lake. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Lower Rock Lake to Texas Creek via the Lower Rock Lake dam spillway and a low-level outlet tunnel. Texas Creek is a tributary to Canyon Creek downstream of Bowman Lake.

Culbertson Lake

Culbertson Lake has a maximum surface area of 70.5 acres, is 0.7 mile long, and has a maximum storage capacity of 3,150 acre-feet (usable storage is 953 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-8. Maximum drawdown occurs in October or November. The reservoir shoreline is 2 miles long. The drainage area of Culbertson Lake is 0.47 square mile and is unregulated. Culbertson Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. Similar to Upper Rock Lake, there is minimal carryover storage in Culbertson Lake. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Culbertson Lake to an unnamed tributary of Texas Creek via the Culbertson Lake dam spillway and a low-level outlet tunnel.

Upper Lindsey Lake

Upper Lindsey Lake has a maximum surface area of 3.9 acres, is 0.12 mile long, and has an unknown maximum storage capacity (usable storage is 18 acre-feet). PG&E did not present storage frequency data for Upper Lindsey Lake. The reservoir shoreline is 0.5 mile long. The drainage area into Upper Lindsey Lake is 0.16 square mile and is unregulated. Upper Lindsey Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall months to augment storage in Lake Spaulding. Similar to Upper Rock Lake, there is minimal carryover storage in Upper Lindsey Lake. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Upper Lindsey Lake to Middle Lindsey Lake via the Upper Lindsey Lake dam spillway and a low-level outlet tunnel to Lindsey Creek.

Middle Lindsey Lake

Middle Lindsey Lake has a maximum surface area of 21.5 acres, is 0.3 mile long, and has an unknown maximum storage capacity (usable storage is 110 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-9. Maximum drawdown occurs in October or November. The reservoir shoreline is 1.2 miles long. The drainage area of Middle Lindsey Lake is 0.38 square mile, with the majority of inflow regulated by local accretion and releases from Upper Lindsey Lake. Middle Lindsey Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. Similar to Upper Lindsey Lake, there is minimal carryover storage in Middle Lindsey Lake. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Middle Lindsey Lake to Lower Lindsey Lake via the Middle Lindsey Lake dam spillway and a low-level outlet tunnel to Lindsey Creek.

Lower Lindsey Lake

Lower Lindsey Lake reservoir has a maximum surface area of 29.4 acres, is 0.4 mile long, and has an unknown maximum storage capacity (usable storage is 278 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-10. Maximum drawdown occurs in October, November, December, or January. The reservoir shoreline is 0.9 mile long. The drainage area of Lower Lindsey Lake is 0.88 square mile, with the majority of inflow regulated by local accretion and releases from Middle Lindsey Lake. Lower Lindsey Lake is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. Similar to Upper Lindsey Lake, there is minimal carryover storage in Lower Lindsey Lake. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Lower Lindsey Lake to Lindsey Creek via the Lower Lindsey Lake dam spillway and a low-level outlet tunnel. Lindsey Creek is a tributary to Texas Creek upstream of the Bowman-Spaulding conduit.

Feeley Lake

Feeley Lake has a maximum surface area of 52 acres, is 0.5 mile long, and has an unknown maximum storage capacity (usable storage is 739 acre-feet). PG&E did not present storage frequency data for Feeley Lake. The reservoir shoreline is 1.6 miles long. The drainage area into Feeley Lake is 0.4 square mile and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Feeley Lake. Because the reservoir is located at high elevation, it does not have any major tributaries contributing inflow. Water is normally released from Feeley Lake to Carr Lake via the Feeley Lake dam spillway and low-level outlet to Lake Creek.

Carr Lake

Carr Lake has a maximum surface area of 15.8 acres, is 0.2 mile long, and has an unknown maximum storage capacity (usable storage is 150 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-11. Maximum drawdown occurs between December and February. The reservoir shoreline is 0.6 mile long. The drainage area into Carr Lake is 0.48 square mile, with the majority of inflow regulated by local accretion and releases from Feeley Lake. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Carr Lake. Carr Lake does not have any major tributaries contributing inflow. Water is normally released to the Bowman-Spaulding conduit via the Carr Lake dam spillway and low-level outlet to Lake Creek. Lake Creek is a tributary to Fall Creek upstream of the intersection with the Bowman-Spaulding conduit. Fall Creek is a tributary to the South Yuba River downstream of Lake Spaulding.

Blue Lake

Blue Lake has a maximum surface area of 59.7 acres, is 0.4 mile long, and has a maximum storage capacity of 4,042 acre-feet (usable storage is 1,158 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-12. Maximum drawdown occurs in December to January. Throughout the year, the 50 percent exceedance value is about half of the 10 percent exceedance value. This frequency analysis indicates that Blue Lake is rarely at full capacity. The reservoir shoreline is 1.3 miles long. The drainage area into Blue Lake is 0.24 square mile and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Blue Lake. Blue Lake does not have any major tributaries contributing

inflow. Water is normally released to Rucker Lake via the Blue Lake dam spillway and low-level outlet to Rucker Creek.

Rucker Lake

Rucker Lake has a maximum surface area of 78.6 acres, is 0.6 mile long, and has an unknown maximum storage capacity (usable storage is 648 acre-feet). PG&E did not present storage frequency data for Rucker Lake. The reservoir shoreline is 1.5 miles long. The drainage area into Rucker Lake is 1.65 square miles, with the majority of inflow regulated by local accretion and releases from Blue Lake. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Rucker Lake. Rucker Lake does not have any major tributaries contributing inflow. Water is normally released to the Bowman-Spaulding conduit via the Rucker Lake dam spillway and low-level outlet to Rucker Creek. Rucker Creek is a tributary to Clear Creek and then to the South Yuba River downstream of Lake Spaulding.

Fuller Lake

Fuller Lake has a maximum surface area of 70.2 acres, is 0.5 mile long, and has an unknown maximum storage capacity (usable storage is 1,109 acre-feet). PG&E did not present storage frequency data for Fuller Lake. The reservoir shoreline is 0.3 mile long. The drainage area into Fuller Lake reservoir is 0.54 square mile and is unregulated. Water diverted through Bowman-Spaulding conduit contributes to the majority of inflow into Fuller Lake. The reservoir is operated as a re-regulating pool for hydropower generation shaping. Water is normally released from Fuller Lake to Lake Spaulding through the Spaulding no. 3 powerhouse via Fuller Lake dam spillway, low-level outlet, penstock, and Bowman-Spaulding conduit. Minimum, mean, and maximum flows through the Spaulding no. 3 powerhouse are 0, 200.2, and 412 cfs, respectively (USGS gage 11416200/YB-253).

Spaulding No. 1 and No. 2 Development

Meadow Lake

Meadow Lake has a maximum surface area of 240 acres, is 1.2 miles long, and has a maximum storage capacity of 4,935 acre-feet (usable storage is 4,841 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-13. Maximum drawdown occurs in November to December. The reservoir shoreline is 3.3 miles long. The drainage area into Meadow Lake is 1.3 square miles and is unregulated. Meadow Lake is the second highest reservoir within the project and, similar to White Rock Lake reservoir, receives a large amount of snowmelt influence. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Fordyce Lake and Lake Spaulding. As a result, there is minimal carryover storage in Meadow Lake. Meadow Lake has one small, unnamed stream that contributes some inflow to the reservoir. Water is normally released to Fordyce Lake via the Meadow Lake dam spillway and low-level outlet tunnel via the unnamed tributary to Fordyce Lake.

White Rock Lake

White Rock Lake has a maximum surface area of 88.9 acres, is 0.5 mile long, and has an unknown maximum storage capacity (usable storage is 570 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-14. Maximum drawdown occurs in November to December. The reservoir shoreline is 1.6 miles long. The drainage area into White Rock Lake is 1.17 square miles and is unregulated. The White Rock Creek watershed above White Rock Lake includes the highest altitude within the project vicinity and, thus, has

the largest amount of snowmelt influence of the project reservoirs. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Fordyce Lake and Lake Spaulding. As a result, there is minimal carryover storage in White Rock Lake. White Rock Lake does not have any major tributaries contributing inflow to the reservoir. Water is normally released to Fordyce Lake via the White Rock Lake dam spillway and low-level outlet to White Rock Creek and then to North Creek.

Lake Sterling

Lake Sterling has a maximum surface area of 104.7 acres, is 0.5 mile long, and has an unknown maximum storage capacity (usable storage is 1,764 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-15. Maximum drawdown occurs in November to December. The reservoir shoreline is 1.8 miles long. The drainage area into Lake Sterling reservoir is 1.06 square miles and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Fordyce Lake and Lake Spaulding. As a result, there is minimal carryover storage in Lake Sterling. Lake Sterling has no major tributaries that contribute inflow. Water is normally released from Lake Sterling to Fordyce Lake via the Lake Sterling dam spillway and low-level outlet to Bloody Creek.

Fordyce Lake

Fordyce Lake has a maximum surface area of 716.2 acres, is 3.4 miles long, and has a maximum storage capacity of 49,525 acre-feet (usable storage is 49,426 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-16. Maximum drawdown occurs in November to December. Historically June is the only month when Fordyce Lake approaches maximum storage and full pond. The reservoir shoreline is 10.4 miles long. The drainage area into Fordyce Lake is 31.29 square miles and is unregulated. Releases from White Rock Lake, Meadow Lake, and Lake Sterling contribute the majority of inflow to Fordyce Lake. Fordyce Lake is also the confluence of seven small, unnamed streams, which contribute some inflow. The reservoir is operated for water delivery scheduling and carryover storage maintenance in Fordyce Creek. Water is normally released from Fordyce Lake to Lake Spaulding via the Fordyce Lake dam spillway and low-level outlet to Fordyce Creek.

Kidd Lake

Kidd Lake has a maximum surface area of 86.7 acres, is 0.5 mile long, and has an unknown maximum storage capacity (usable storage is 1,505 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-17. Maximum drawdown occurs in November to December. The reservoir shoreline is 1.7 miles long. The drainage area into Kidd Lake is 0.56 square mile and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Kidd Lake. There are no major tributaries contributing inflow to Kidd Lake. Water is normally released from Kidd Lake to Lake Spaulding via the Kidd Lake dam spillway and low-level outlet to an unnamed tributary to the upper South Yuba River, and then to the South Yuba River.

Upper Peak Lake

Upper Peak Lake has a maximum surface area of 83.8 acres, is 0.6 mile long, and has an unknown maximum storage capacity (usable storage is 1,736 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in

table 3-18. Maximum drawdown occurs in November to December. The reservoir shoreline is 2.4 miles long. The drainage area into Upper Peak Lake is 0.62 square miles and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Upper Peak Lake. Water is normally released from Upper Peak Lake to Lower Peak Lake via the Upper Peak Lake dam spillway and low-level outlet.

Lower Peak Lake

Lower Peak Lake has a maximum surface area of 33 acres, is 0.4 mile long, and has an unknown maximum storage capacity (usable storage is 484 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-19. Maximum drawdown occurs in November to December. The reservoir shoreline is 1.1 miles long. The drainage area into Lower Peak Lake is 1.01 square miles, with the majority of inflow regulated by local accretion and released from Upper Peak Lake. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment storage in Lake Spaulding. As a result, there is minimal carryover storage in Lower Peak Lake. Water is normally released from Lower Peak Lake to Lake Spaulding via the Lower Peak Lake dam spillway and low-level outlet, Cascade Creek, and South Yuba River.

Lake Spaulding

Lake Spaulding has a maximum surface area of 682 acres, is 2.2 miles long, and has a maximum and usable storage capacity of 75,912 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-20. Maximum drawdown occurs in December to February. Storage is closest to maximum capacity from May through July, but rarely reaches full pool. The reservoir shoreline is 8.6 miles long. The drainage area into Lake Spaulding is 117.7 square miles and is mostly unregulated. However, inflows to Lake Spaulding are regulated by releases from Fordyce Lake and flow diverted through Bowman-Spaulding and Jordan canals. The reservoir is principally used for water delivery scheduling and carryover storage maintenance in the South Yuba River. Gonelson Canyon also flows into Lake Spaulding on the southeastern edge of the reservoir. Lake Spaulding releases water to several different project-affected reaches: Jordan Creek, South Yuba River, South Yuba canal, and Drum canal. Releases to Jordan Creek are made through the Lake Spaulding no. 2 dam via an unnamed tributary to Jordan Creek. Releases to the South Yuba River are made through the Lake Spaulding no. 1 dam via the low-level outlet and through the Spaulding no. 2 powerhouse on the South Yuba canal. Releases to the South Yuba canal are made through the Spaulding no. 2 powerhouse via the low-level outlet and the Spaulding no. 2 powerhouse penstock. Releases to Drum canal are made through the Spaulding no. 1 powerhouse via the low-level outlet and the Spaulding no. 1 powerhouse penstock. Minimum, mean, and maximum recorded daily flows through the Spaulding no. 1 and no. 2 powerhouses are 0, 501, and 864 cfs, and 0, 73, and 235 cfs, respectively (USGS gages 11414154/YB-251 and 11414155/YB-252).

Deer Creek Development

Deer Creek forebay has a maximum surface area of 3.3 acres, is 0.08 mile long, and has a maximum storage capacity of 15.8 acre-feet (usable storage is 10.7 acre-feet). PG&E did not present storage frequency data for Deer Creek forebay. The reservoir shoreline is 0.2 mile long. Inflow to the forebay is regulated by local accretion and releases through the Spaulding no. 2 powerhouse via the South Yuba canal and Chalk Bluff canal. Water is normally released from Deer Creek forebay to the South Fork of Deer Creek, through the Deer Creek powerhouse via the Deer Creek dam spillway, low-level outlet, and penstock. Minimum, mean, and maximum recorded daily flows through Deer Creek powerhouse are 0, 48.1, and 116 cfs, respectively (USGS gage 11414205/YB-247).

Drum No. 1 and No. 2 Development

Lake Valley Reservoir

Lake Valley reservoir has a maximum surface area of 303.9 acres, is 1.9 miles long, and has a maximum and usable storage capacity of 7,902 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-21. Maximum drawdown occurs between November and February. The reservoir shoreline is 4.7 miles long. The drainage area into Lake Valley reservoir is 4.36 square miles and is unregulated. Lake Valley reservoir is also the confluence point of seven unnamed intermittent streams. The reservoir is operated for water delivery scheduling and carryover storage maintenance in the North Fork of the North Fork American River. Water is normally released from Lake Valley reservoir to Drum forebay in the Bear River Basin via the Lake Valley dam spillway and low-level outlet to the North Fork of the North Fork American River, Lake Valley canal diversion dam, Lake Valley canal, and Drum canal.

Kelly Lake

Kelly Lake has a maximum surface area of 28 acres, is 0.3 mile long, and has an unknown maximum storage capacity (usable storage is 352 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-22. Maximum drawdown occurs in November. The reservoir shoreline is 0.8 mile long. The drainage area into Kelly Lake reservoir is 0.53 square mile and is unregulated. The reservoir is operated to capture spring and early summer runoff, and to release flow in the summer and fall to augment flows diverted from the North Fork of the North Fork American River to the Bear River Basin. As a result, the reservoir has minimal carryover storage. Water is normally released from Kelly Lake to Drum forebay via the Kelly Lake dam spillway and low-level outlet, Sixmile Creek, the North Fork of the North Fork American River, Lake Valley canal, and Drum canal.

Drum Forebay

Drum forebay has a maximum surface area of 20 acres, is 0.3 mile long, and has a maximum storage capacity of 621 acre-feet (usable storage is 436 acre-feet). PG&E did not present storage frequency data for Drum forebay. The reservoir shoreline is 0.8 mile long. Inflow to the forebay is regulated by local accretion and releases to Drum canal through the Spaulding no. 1 powerhouse and Lake Valley canal. Water is normally released from Drum forebay to either Alta forebay or to Drum afterbay through the Drum no. 1 and no. 2 powerhouses. Releases to Alta forebay are made via the Drum forebay dam spillway and low-level outlet, Towle diversion canal, Canyon Creek, and Towle canal. Releases to the Drum no. 1 and no. 2 powerhouses are made via the Drum forebay dam spillway, low-level outlet, and penstocks. Minimum, mean, and maximum recorded daily flows through the Drum no. 1 and no. 2 powerhouses are 0, 166, and 640 cfs, and 0, 320, and 680 cfs, respectively (USGS gage 11414194/YB-248 and 11414195/YB-249).

Alta Development

Alta forebay has a maximum surface area of 5 acres, is 0.14 mile long, and has a maximum storage capacity of 37.5 acre-feet (usable storage is 19.4 acre-feet). PG&E did not present storage frequency data for Alta forebay. The reservoir shoreline is 0.3 mile long. Inflow into Alta forebay is regulated by local accretion, releases from Drum forebay to Towle canal via Towle diversion canal and Canyon Creek (tributary to North Fork of the North Fork American River). The reservoir is operated as a re-regulating reservoir to buffer variations in upstream canal flows. The majority of water released from Alta forebay through Alta powerhouse on Little Bear Creek is diverted to PCWA's Lower Boardman canal. The remaining flow is released to Dutch Flat afterbay through Alta powerhouse and the Little Bear

River. Minimum, mean, and maximum recorded daily flows through Alta powerhouse are 0, 15, and 57 cfs,⁵ respectively (USGS gage 11421725/YB-246).

Dutch Flat No. 1 Development

Drum afterbay (Drum-Spaulling Project) on the Bear River has a maximum surface area of 10 acres, is 0.4 mile long, and has a maximum storage capacity of 154.5 acre-feet (usable storage is 150.4 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-23. Drum afterbay is operated as a re-regulating reservoir and the frequency analysis indicates that it operates at full pool throughout the year in most years. The reservoir shoreline is 1.0 mile long. The Bear River watershed above Drum afterbay is 11.91 square miles and is unregulated except for releases from the Drum canal and South Yuba canal waste gates. Releases from Drum forebay and local accretion contribute some inflow to the afterbay. The reservoir is operated as a re-regulating pool for hydropower generation shaping. Water is normally released from Drum afterbay either to the Bear River and Dutch Flat afterbay, to Dutch Flat afterbay through Dutch Flat no. 1 powerhouse, or to Dutch Flat forebay via Dutch Flat no. 2 flume. Minimum, mean, and maximum recorded daily flows through Dutch Flat no. 1 powerhouse are 0, 224, and 8,770 cfs, respectively (USGS gage 11421750/YB-194).

Halsey Development

Halsey forebay has a maximum surface area of 18 acres, is 0.2 mile long, and has a maximum capacity of 244 acre-feet (usable storage is 238 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-24. The Halsey forebay storage frequency analysis indicates that it operates at full pool throughout the year in many years. The reservoir shoreline is 0.6 mile long. Inflows into Halsey forebay are regulated by local accretion and flow diverted through Bear River canal. The reservoir is operated to re-regulate inflows for daily peaking purposes in Halsey powerhouse. Water is normally released from Halsey forebay to Halsey afterbay through Halsey powerhouse on the Bear River canal via Halsey forebay dam spillway, low-level outlet, and penstock. Minimum, mean, and maximum recorded daily flows through Halsey powerhouse are 0, 320, and 562 cfs, respectively (USGS gage 11425310/YB-250).

Wise and Wise No. 2 Developments

Halsey Afterbay

Halsey afterbay has a maximum surface area of 10.3 acres, is 0.2 mile long, and has a maximum storage capacity of 86 acre-feet (usable storage is 76 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-25. The Halsey afterbay storage frequency analysis indicates that it operates at less than full pool throughout the year in many years. The reservoir shoreline is 0.5 mile long. Halsey afterbay is operated as a re-regulating pool for hydropower generation shaping, capturing flow from the Dry Creek watershed, which is about 3.08 square miles at Halsey afterbay and is unregulated. Most inflow to Halsey afterbay is regulated by releases from Halsey forebay. Water is normally released from Halsey afterbay to Rock Creek reservoir via Halsey afterbay dam spillway and low-level outlet to Upper Wise canal. Additional releases are made from Halsey afterbay to Dry Creek, which does not have a minimum flow requirement under the current license.

⁵ While Alta powerhouse unit 2 was decommissioned in 2007, the flows at this gage were observed with both units in service.

Rock Creek Reservoir

Rock Creek reservoir has a maximum surface area of 58 acres, is 0.6 mile long, and has a maximum storage capacity of 485 acre-feet (usable storage is 482 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-26. Maximum drawdown occurs in November or December; the storage frequency analysis indicates that about half the time Rock Creek reservoir is drawn down significantly. The reservoir shoreline is 1.8 miles long. The drainage area into Rock Creek reservoir is 2.18 square miles and is unregulated. Although the drainage area is unregulated, inflows into Rock Creek reservoir are regulated by releases from Halsey afterbay. The reservoir is operated as a re-regulating pool for hydropower generation shaping and acts as a regulating “interbay” between Halsey afterbay and Wise forebay. Water is normally released from Rock Creek reservoir to Wise forebay in the Auburn Ravine sub-basin via Rock Creek dam spillway and low-level outlet to the Lower Wise canal. Additional releases are made from Rock Creek reservoir to Rock Creek, which does not have a minimum flow requirement under the current license.

Wise Forebay

Wise forebay has a maximum surface area of 4.5 acres, is 0.1 mile long, and has a maximum storage capacity of 32 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-27. The Wise forebay storage frequency analysis indicates that it operates at less than full pool most of the time, but fluctuation in water surface level is relatively minor. The reservoir shoreline is 0.3 mile long. Inflow to Wise forebay is regulated by releases from Rock Creek reservoir via the Lower Wise canal. Water is released from Wise forebay via the Wise dam spillway, low-level outlet, and penstock through the Wise no. 1 and no. 2 powerhouses. Combined minimum, mean, and maximum recorded daily flows through the Wise no. 1 and no. 2 powerhouses are 0, 288, and 470 cfs, respectively (USGS gage 11425415/YB-254). Most flow is released through the Wise powerhouses to the Newcastle powerhouse header box via South canal. Combined minimum, mean, and maximum recorded daily flows through the Newcastle powerhouse are 0, 140, and 388 cfs, respectively (USGS gage 11425416/YB-289). Releases of water from the Wise powerhouse can be made from South canal to Auburn Ravine (which does not have a minimum flow requirement under the current license) at two locations (Auburn Ravine RM 27.64 and RM 27.35). These releases are made to spill flow in excess of the capacity of South canal during winter, to meet demand for NID water deliveries, and for emergency purposes.

Project-Affected Stream Reaches

Spaulding No. 3 Development

Texas Creek Below Upper Rock Lake Dam

Texas Creek, a tributary to Canyon Creek, is only 0.1 mile long between Upper Rock Lake and Lower Rock Lake. The minimum streamflow requirement in the reach below Upper Rock Lake dam under the existing license is 0.1 cfs with a target flow of 0.25 cfs between July 1 and September 30; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-28. Median (50th percentile) monthly flow is 0 cfs between July and November; peak median flow (1.7 to 2.3 cfs) occurs during April and May. Peak flows at the 10 percent exceedance (3.2 to 4.7 cfs) are more than double the median flows and occur between April and June. PG&E did not estimate unregulated flows for this high elevation, low flow reach.

Texas Creek Below Lower Rock Lake Dam

Below Lower Rock Lake dam, Texas Creek extends 3.6 miles to the confluence of Lindsey Creek, then another 0.5 mile to the Bowman-Spaulding conduit. The upper portion of this reach has an average elevation of 6,011 feet msl and a channel gradient of 10.6 percent. The lower 0.5 mile has a similar gradient at an average elevation of 5,560 feet msl. The minimum streamflow requirement in this reach under the existing license is 0.1 cfs with a target flow of 0.25 cfs between July 1 and September 30; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-29. The lowest monthly median (50th percentile) flow is 0.3 cfs between June and August; peak median flow is 1.0 cfs in October; however, no data are available for the period of January through April. The estimated unregulated data indicate that the median monthly would be 0 cfs between July and October, with the peak median flow in April and May (2.8 to 3.8 cfs). Peak monthly unregulated flows at the 10 percent exceedance are more than double the median flows.

Unnamed Tributary Below Culbertson Lake Dam

The Culbertson Lake dam reach is a 0.2-mile-long unnamed tributary of Texas Creek with an average elevation of 6,420 feet msl and a channel gradient of 5.3 percent. The minimum streamflow requirement in this reach under the existing license is 0.3 cfs, with a target flow of 0.75 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1 with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-30. The monthly median (50th percentile) flows are 0.7 to 0.9 cfs year round; however, no data are available for the period of January through March. Peak monthly flows at the 10 percent exceedance (0.9 to 1.2 cfs) are slightly higher than the median flows. The estimated unregulated data indicate that the median monthly flow would be 0 cfs between August and October with the peak median flow in April and May (4.6 to 6.4 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to three times the median flows.

Lindsey Creek Below Upper Lindsey Lake Dam

Below Upper Lindsey Lake dam, Lindsey Creek, a tributary to Texas Creek, is 0.1 mile long down to Middle Lindsey Lake. The reach has an average elevation of 6,468 feet msl and a channel gradient of 11.0 percent. There is no minimum streamflow requirement in this reach under the existing license. PG&E did not present historical (regulated) data for this reach. The estimated unregulated data (Table 3-31) indicate that the median monthly flow would be less than 0.2 cfs between July and January, with the peak median flow in April and May (1.6 to 2.4 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to six times the median flows.

Lindsey Creek Below Middle Lindsey Lake Dam

Below Middle Lindsey Lake dam, Lindsey Creek, a tributary to Texas Creek, is 0.3 mile long extending to Lower Lindsey Lake. The reach has an average elevation of 6,336 feet msl and a channel gradient of 12.9 percent. The minimum streamflow requirement in this reach under the existing license is 0.1 cfs, with a target flow of 0.25 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-32. The monthly median (50th percentile) flow was 0 cfs in November and December and 0.3 to 0.5 cfs the rest of the year. Peak monthly flows at the 10 percent exceedance (0.2 to 0.8 cfs) are generally double the median flows. The estimated unregulated

data indicate that the median monthly flow would be less than 0.1 cfs between July and November with the peak median flow in April and May (3.7 to 5.2 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to four times the median flows.

Lindsey Creek Below Lower Lindsey Lake Dam

The Lower Lindsey Lake dam reach extends 1.4 miles downstream to the confluence with Texas Creek. The reach has an average elevation of 5,940 feet msl and a channel gradient of 7.1 percent. The minimum streamflow requirement in this reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-33. The monthly median (50th percentile) flow was fairly constant, ranging from 0.6 to 0.9 cfs in April through January. Peak monthly flows at the 10 percent exceedance (0.9 to 1.1 cfs) are generally the same to 1.5 times the median flows. The estimated unregulated data indicate that the median monthly would be 0.1 cfs between July and October with the peak median flow in April and May (8.6 to 12.0 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to three times the median flows.

Lake Creek Below Feeley Lake Dam

This reach of Lake Creek, a tributary to Fall Creek, extends 0.1 mile from Feeley Lake dam downstream to Carr Lake. The average elevation of this reach is 6,694 feet msl, and the channel gradient is 4.7 percent. The minimum streamflow requirement in this reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-34. The monthly median (50th percentile) flow was 0.6 to 0.8 cfs throughout the year. Peak monthly flows at the 10 percent exceedance (2.2 to 2.3 cfs) occurred in September and October. The estimated unregulated data indicate that the median monthly would be less than 0.1 cfs between July and November, with the peak median flow in April and May (4.0 to 5.7 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to four times the median flows.

Lake Creek Below Carr Lake Dam

This reach of Lake Creek extends 2.2 miles from Carr Lake dam downstream to the confluence with Fall Creek. The average elevation of this reach is 6,112 feet msl and the channel gradient is 10 percent. The minimum streamflow requirement in this reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. Historical monthly streamflow in this reach is summarized at the 10, 50 (median), and 90 percent exceedance values for the period of record in table 3-35. The monthly median (50th percentile) flow was 0.4 to 1.2 cfs from December through September and 2.0 to 2.2 cfs in October and November. Peak monthly flows at the 10 percent exceedance (293.8 to 414.6 cfs) occurred in April and May. The estimated unregulated data indicate that the median monthly would be less than 0.1 cfs between July and November, with the peak median flow in April and May (4.8 to 6.8 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to four times the median flows.

Rucker Creek Below Blue Lake Dam

Blue Lake dam reach of Rucker Creek is about 0.7 mile long between Blue Lake and Rucker Lake. The average elevation of the reach is 5,691 feet msl with a channel gradient of 9.5 percent. The minimum streamflow requirement in this reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-36 indicate that the median monthly would be 0 cfs between July and October, with the peak median flow in April and May (2.2 to 2.9 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to six times the median flows.

Rucker Creek Below Rucker Lake Dam

Rucker Lake dam reach of Rucker Creek is about 0.4 mile long, extending downstream to the Bowman-Spaulding conduit. The average elevation of the reach is 5,371 feet msl with a channel gradient of 2.8 percent. The minimum streamflow requirement in this reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round; the existing license provides an equation for downward adjustment of minimum flow based on storage on July 1, with a correction for evaporation during dry years. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-37 indicate that the median monthly flow would be less than 1 cfs between July and November, with the peak median flow in April and May (15.0 to 19.8 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to ten times the median flows.

Unnamed Tributary Below Fuller Lake Dam

The tributary to Jordan Creek that flows out of Fuller Lake dam is about 1 mile long. The average elevation of the reach is 4,960 feet msl and the channel gradient is 14.5 percent. The Fuller Lake dam reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-38 indicate that the median monthly flow would be 0 cfs between July and September with the peak median flow in April and May (4.6 to 6.1 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to three times the median flows.

Spaulding No. 1 and No. 2 Development

Unnamed Tributary Below Meadow Lake Dam

Meadow Lake dam reach is a tributary to the upper South Yuba River upstream from Spaulding dam. This reach is 1.4 miles long with an average elevation of 6,845 feet msl and a channel gradient of 11.9 percent. This reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-39 indicate that the median monthly flow would be 0.1 cfs between August and October with the peak median flow in April and May (10.2 to 19.8 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to seven times the median flows.

White Rock Creek Below White Rock Diversion Dam

White Rock Lake diversion dam reach is a tributary to North Creek upstream of Fordyce Lake. This reach is about 2.7 miles long with an average elevation of 7,360 feet msl and a channel gradient of 6.5 percent. This reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in

table 3-40 indicate that the median monthly would be 0.1 cfs between August and October with the peak median flow in April through June (7.6 to 19.3 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to five times the median flows.

Bloody Creek Below Lake Sterling Dam

Bloody Creek between Lake Sterling and the upper South Yuba River upstream of Lake Spaulding is about 0.3 mile long. The average elevation is 6,695 feet msl with a channel gradient of 31.3 percent. The Lake Sterling dam reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-41 indicate that the median monthly flow would be 0.1 cfs between August and October with the peak median flow in April and May (8.2 to 15.1 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to three times the median flows.

Fordyce Creek Below Fordyce Lake Dam

Fordyce Creek below Fordyce Lake dam (i.e., Fordyce Lake dam reach) is 10.5 miles long and extends from the outlet at Fordyce Lake dam (elevation [El.] 6,280 feet msl at RM 10.5) to the normal maximum water surface elevation of Lake Spaulding (El. 5,014.6 feet msl at RM 0.0). The average channel gradient is 15.1 percent. Minimum flow in this reach under the existing license is 5 cfs year round; during unattended winter operation, the initial flow is set at 5 cfs and not less than 3 cfs at maximum lake level winter drawdown. The historical range and seasonality of flows in this reach are summarized in table 3-42 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Estimated unregulated flows for the same period are presented for comparison in table 3-42. The period of peak median flow (128 to 265 cfs) under existing conditions occurs between June and August; lowest flows occur during winter and early spring (12 to 44 cfs). Highest predicted median flows (100 to 455 cfs) under unregulated conditions occur during spring (March through May), with lowest flows (2 to 8.5 cfs) from July through November.

Unnamed Tributary Below Kidd Lake Dam

The Kidd Lake dam reach extends about 0.7 mile downstream to its confluence with upper South Yuba River upstream of Lake Spaulding. The average elevation of this reach is 6,340 feet msl, with a channel gradient of 16.6 percent. This reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-43 indicate that the median monthly flow would be 0 cfs between August and October with the peak median flow in April and May (5.0 to 6.7 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to three times the median flows.

Cascade Creek Below Lower Peak Lake Dam

The Lower Peak Lake dam reach of Cascade Creek extends about 1.1 miles downstream to the upper South Yuba River. The average elevation of this reach is 6,300 feet msl, with a channel gradient of 9.6 percent. This reach does not have a minimum streamflow requirement under the existing license. PG&E did not present historical monthly streamflow in this reach. The estimated unregulated data in table 3-44 indicate that the median monthly flow would be 0.1 cfs between July and October with the peak median flow in April and May (9.0 to 12.1 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to four times the median flows.

South Yuba River Below Kidd Lake Dam and Lower Peak Lake Dam

The South Yuba River below Kidd Lake dam and Lower Peak Lake dam, also referred to as Upper South Yuba River reach no. 2 at Cisco Grove, lies downstream of the confluence of Cascade Creek with the South Yuba River, and continues 12.2 miles to Lake Spaulding, with an overall average channel gradient of 1.6 percent. Other reaches upstream of this reach include the Upper South Yuba River reach no. 1, Kidd Lake dam reach, and Lower Peak Lake dam reach. Under the existing license, the minimum streamflow in upper South Yuba River at Cisco Grove, California (YB-316 gage) is 5 cfs year round. The historical range and seasonality of flows in this reach are summarized in table 3-45 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Estimated unregulated flows for the same period are presented for comparison in table 3-45. The period of peak median flow (414 to 651 cfs) under existing conditions occurs between April and June; lowest flows occur from July through November (8 to 19 cfs). Highest predicted median flows (424 to 681 cfs) under unregulated conditions occur during spring (April and May), with lowest flows (3.0 to 12.5 cfs) from July through November. Historical and estimated unregulated flows are very similar through this reach, although the lowest median historical monthly flows are slightly higher than unregulated conditions.

South Yuba River Below Lake Spaulding Dam

South Yuba River from Lake Spaulding dam (El. 4,680 feet msl at RM 41.5) to the normal maximum water surface elevation of the U.S. Army Corps of Engineer's Englebright reservoir (about El. 535 feet msl at RM 0.0) is 41.1 miles long and has an average gradient of about 2 percent. For relicensing, PG&E divided this section of river into eight reaches. The five lower reaches (between Rucker Creek and Englebright reservoir) are cumulatively affected by the Drum-Spaulding Project, NID's Yuba-Bear Project, and multiple other factors. The three reaches (from upstream to downstream) with direct and indirect effects include:

- South Yuba River below Spaulding dam reach – the 0.2-mile-long section from Spaulding dam to Spaulding no. 2 powerhouse.
- South Yuba River below Spaulding no. 2 powerhouse reach – the 0.7-mile-long section from Spaulding no. 2 powerhouse to Jordan Creek.
- South Yuba River reach no. 1 – the 3.2-mile-long section from Jordan Creek to Rucker Creek (upstream of Lang's Crossing).

The minimum streamflow below Lake Spaulding dam under the existing license is 1.0 cfs year round released at Spaulding no. 2 powerhouse. Minimum total flow released from Lake Spaulding in the South Yuba River at Lang's Crossing is 5.0 cfs year round. Historical streamflow and estimated unregulated flows showing accretion of flow proceeding downstream from Spaulding no. 2 powerhouse to Rucker Creek to Fall Creek to Canyon Creek are provided in table 3-46 to table 3-49. Median flows at the powerhouse range seasonally from 2.3 cfs in December to 6.4 cfs in May, compared to unregulated median flows at this location of 7 cfs in August to about 1,560 cfs in May. Peak historical flows at the 10 percent exceedance are 42 to 44 cfs in May and June, compared to the unregulated 10 percent exceedance of 2,435 to 3,120 cfs (table 3-46). Below the confluence of Canyon Creek, the median historical flows range seasonally from 7.6 cfs in August to 80.7 cfs in May, compared to unregulated median flows ranging from 10.4 cfs in August to 1,771 cfs in May. Peak flows at the 10 percent exceedance historically in May and June range from about 1,240 to 1,410 cfs; unregulated flows in May and June range from 2,715 to 3,530 cfs (table 3-49).

Deer Creek Development

South Fork Deer Creek Below Deer Creek Powerhouse

Deer Creek powerhouse reach is the 0.1-mile-long section of South Fork Deer Creek that extends from the Deer Creek powerhouse (El., 3,600 feet msl at RM 3.0) to NID's Cascade canal diversion dam (El. 3,360 feet msl at RM 2.9), a non-project facility. The average channel gradient is 3.0 percent. Under the existing license, there is no minimum streamflow requirement for this reach. There are no historical data for flows in this reach of South Fork Deer Creek. The historical range and seasonality of flows from the Deer Creek powerhouse into this reach are summarized in table 3-50 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. The period of peak median flow (60 to 62 cfs) under existing conditions occurs between June and September; lowest flows occur during April (0 cfs). At the 10 percent exceedance, peak flows in May and June are 86 to 91 cfs, with flows the rest of the year between 60 and 78 cfs.

Drum No. 1 and No. 2 Development

North Fork of the North Fork American River Below Lake Valley Reservoir Dam

Lake Valley reservoir dam reach is the 3.1-mile-long section of the North Fork of the North Fork American River from Lake Valley reservoir dam (El. 5,800 feet msl at RM 16.3) to Lake Valley canal diversion dam (El. 5,440 ft at RM 13.2). The average channel gradient is 2.0 percent. This reach has a minimum streamflow requirement of 1 cfs year round under the existing license. The historical range and seasonality of flows in this reach of the North Fork of the North American River are summarized in table 3-51 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Median historical flows are 4.2 to 6.0 cfs in June through September; during the rest of the year, median flows are 10.0 to 18.0 cfs. At the 10 percent exceedance, flows in July through September are 19 to 22 cfs; the rest of the year 10 percent exceedance flows are mostly 27.0 to 31.0 cfs, with a peak in May of 43.0 cfs. The estimated unregulated data in table 3-51 indicate that the median monthly would be 0.4 cfs or less between July and October, with the peak median flow in April and May (41.6 to 55.4 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to six times the median flows.

Sixmile Creek Below Kelly Lake Dam

The Kelly lake dam reach of Sixmile Creek is about 0.3 mile long, extending downstream to the North Fork of the North Fork American River. The average elevation of the reach is 5,820 feet msl, with a channel gradient of 4.4 percent. Under the existing license, there is no minimum streamflow requirement; however, Lake Kelly may not be drawn down before August 1. The historical range and seasonality of flows in this reach of Sixmile Creek are summarized in table 3-52 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Median historical flows are 0 cfs in January and February, and July through September; during the rest of the year, median flows are 0.5 to 2.5 cfs. At the 10 percent exceedance, flows in July through September are 1 cfs or less; the rest of the year 10 percent exceedance flows are 2.5 to 5.6 cfs. Estimated unregulated median flows are less than 0.2 cfs from July through November, with unregulated peak median flows of 5.0 to 6.7 cfs in April and May. Peak unregulated flows at the 10 percent exceedance are about twice the peak monthly median flows.

North Fork of the North Fork American River Below Lake Valley Canal Diversion Dam

Lake Valley canal diversion dam reach is the 13.2-mile-long section of the North Fork of the North Fork American River from Lake Valley canal diversion dam (El. 5,440 feet msl at RM 13.2) to

the confluence with the North Fork American River (El. 1,920 feet msl at RM 0.0). The average channel gradient is 5.2 percent. Under the existing license, the minimum streamflow requirement is 1 cfs from October 1 to May 31 and 3 cfs from June 1 through September 30. The historical range and seasonality of flows in this reach of the North Fork of the North Fork American River are summarized in table 3-53 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Median historical flows are 1.2 to 1.5 cfs in October through December and 3.2 to 3.4 cfs in June through September; peak median flows are 21.5 to 33.5 cfs in April and May. Two peaks occur at the 10 percent exceedance flows in December and January (98 to 118 cfs) and March through May (72 to 174 cfs). Estimated unregulated median flows are less than 1 cfs from July through October, less than under existing conditions. Unregulated peak median flows would be 84 to 112 cfs in April and May. Peak unregulated flows at the 10 percent exceedance are about two to four times the peak monthly median flows.

Bear River Below Drum Canal Spillway Gate

Bear River reach no. 1 is the 0.3-mile-long section of the Bear River that extends from the point of inflow from the Drum canal spillway gate (gage YB-137, El. 4,800 feet msl at RM 35.3) to the point of inflow to the Bear River from the South Yuba canal at gage YB-139 (El. 4,600 feet msl at RM 35.0). The gradient of Bear River reach no. 1 is 13.1 percent. Under the existing license, there is no minimum streamflow requirement at the Drum canal spillway. The historical flow data in table 3-54 indicate that the median monthly flow from the Drum canal spillway is 0 cfs from July through April; peak median flow is 50 cfs in May. At the monthly 10 percent exceedance, flows are 0 cfs from August to November and again in January; flows at 10 percent exceedance peak in March through June (185 to 325 cfs).

Bear River At Highway 20 Crossing, Between South Yuba Canal Inflow At Gage YB-139

Bear River reach no. 2 is the 7.6-mile-long section of the Bear River that extends from the point of inflow from gage YB-139 (the downstream end of Bear River reach no. 1) to the normal maximum water surface elevation of Drum afterbay (El. 3,400 feet msl at RM 27.4). The gradient of Bear River reach no. 2 is 3.2 percent. Under the existing license, the only minimum flow requirement is a 5-cfs release from the South Yuba canal year round. The historical range and seasonality of flows in this reach of the Bear River are summarized in table 3-55 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Median historical flows are less than 8 cfs in July through November; peak median flow is 77.5 cfs in May. Peak monthly flow at the 10 percent exceedance occurs in March through May (204 to 264 cfs). Estimated unregulated median flows are less than 1 cfs from July through November, less than under existing conditions. During the rest of the year, unregulated monthly median flows would be 1.7 to 9.8 cfs, also significantly less than historical flows under the existing license. Peak unregulated flow at the 10 percent exceedance is 20.8 cfs in May.

Alta Development

Canyon Creek Below Towle Canal Diversion Dam

Towle canal diversion dam reach is the 3.7-mile-long section of Canyon Creek, a tributary to the North Fork American River, from Towle canal diversion dam (El. 4,200 feet msl at RM 9.3) to the normal maximum water surface elevation of NACO/Thousand Trails' Snowflower reservoir, a non-project facility (El. 3,480 feet msl at RM 2.0). The channel gradient is 3.7 percent. Under the existing license, the minimum flow requirement for this reach is 1 cfs year round or natural streamflow plus 20 percent, whichever is less. The historical range and seasonality of flows in this reach are summarized in table 3-56 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the

period of record under the existing license. Historical median monthly flows are less than 1 cfs in May through January; peak median flow is 1.1 cfs in February through April. Unregulated median flows are less than 1 cfs from July through November. During the rest of the year, unregulated monthly median flows would be 1.4 to 6.0 cfs. Peak unregulated flow at the 10 percent exceedance is 5.9 to 6.0 cfs in March and April.

Little Bear River Below Alta Powerhouse Tailrace

Little Bear River is a tributary of the Bear River. The Alta powerhouse reach is about 2 miles of Little Bear River extending from the Alta powerhouse tailrace to the Dutch Flat afterbay. The reach has an average elevation of 3,140 feet msl and a channel gradient of 8.3 percent. Under the existing license, there is no minimum streamflow requirement for this reach. The historical range and seasonality of flows in this reach of the Little Bear River are summarized in table 3-57 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 0.2 cfs in June through November; peak median flows are 6.2 to 6.7 cfs in February and March. Peak monthly flow at the 10 percent exceedance occurs in January through April (20 to 29 cfs). Unregulated median flows are less than 1 cfs from July through November. During the rest of the year, unregulated monthly median flows would be 1.3 to 5.3 cfs. Peak unregulated flow at the 10 percent exceedance is 16 cfs in May.

Dutch Flat No. 1 Development

Bear River Below Drum Afterbay

Drum Afterbay dam reach is the 4.7-mile-long section of the Bear River from Drum afterbay dam (El. 3,280 ft at RM 26.9) to the normal maximum water surface elevation of Dutch Flat afterbay (El. 2,720 ft at RM 22.2). The channel gradient is 2.3 percent. Under the existing license, minimum streamflow between March 1 and September 30 is 10 cfs in normal years and 5 cfs in dry years, as defined in the license; from October 1 through the end of February, the minimum flow is 5 cfs during any year. The historical range and seasonality of flows in this reach of the Bear River below Drum afterbay are summarized in table 3-58 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 5.9 to 6.1 cfs in October through February; peak median flows are 10 to 11 cfs in March through September. Monthly flow at the 10 percent exceedance peaks at 70 cfs in April and is 7 to 13 cfs throughout most of the rest of the year. Unregulated peak median flows are 47 to 55 cfs from March through May. During most of the rest of the year, unregulated monthly median flows would be 4 to 18 cfs. Peak unregulated flows at the 10 percent exceedance are 109 to 128 cfs in February through May.

Halsey Development

Bear River Diversion Dam and Bear River Canal

The Bear River canal diversion dam is located immediately downstream of the Rollins dam, diverting water to the Halsey Development and for delivery to water users in western Placer County. Water diversion to the Bear River canal serves the primary purpose of water supply delivery; PG&E's project developments, Halsey, Wise, and Newcastle, take advantage of these water transfers to generate electricity. The Bear River diversion dam essentially has the same requirement for minimum release to the Bear River as the requirement at Rollins dam (Yuba-Bear Project, Bowman Development). Flow diverted from the Bear River into the Bear River canal to the Halsey forebay is the flow in excess of the minimum Bear River flow released from Rollins powerhouse and dam (Yuba-Bear Project, Bowman Development) up to the capacity of the canal. The historical flow data in table 3-59 indicate that the median monthly flow in the Bear River canal is 400 to 446 cfs from March through October, peak median

flow is 446 cfs in August, and the lowest median flow is 243 cfs in November. At the 10 percent exceedance, flows are relatively constant throughout the year (473 to 483 cfs); flows at the 10 percent exceedance peak in April (483 cfs).

Wise and Wise No. 2 Developments

Dry Creek Below Halsey Afterbay Dam

Halsey afterbay dam reach of Dry Creek is about 2.2 miles long, between the Halsey afterbay dam and the high-water pool of Redhawk Ranch reservoir (non-project). The reach has an average elevation of 1,450 feet msl and a channel gradient of 1.6 percent. Under the existing license, there is no minimum streamflow requirement for the Halsey afterbay dam reach of Dry Creek. PG&E did not present a historical flow frequency analysis for this reach of Dry Creek. Unregulated peak median flows (table 3-60) are 6.1 to 6.5 cfs during March and April. During most of the rest of the year, unregulated monthly median flows would be 0.7 to 4 cfs. Peak unregulated flows at the 10 percent exceedance are 14 to 20 cfs in January to May.

Rock Creek Below Rock Creek Diversion Dam

Rock Creek dam reach of Rock Creek is about 2.1 miles long and extends from Rock Creek dam downstream to the confluence with Dry Creek. The reach has an average elevation of 1,310 feet msl and a channel gradient of 2.4 percent. Under the existing license, there is no minimum streamflow requirement for the Rock Creek dam reach. The historical range and seasonality of flows in this reach of the Bear River below Drum afterbay are summarized in table 3-61 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 0.1 to 0.3 cfs year round. Lowest monthly flow at the 10 percent exceedance occur in October and March through April (8.4 to 9.4 cfs); throughout most of the rest of the year, flows are generally 20 to 40 cfs. Unregulated peak median flows are 4.0 to 4.3 cfs in March and April. During most of the rest of the year, unregulated monthly median flows would be 0.5 to 2.7 cfs. Peak unregulated flows at the 10 percent exceedance are 10 to 13 cfs in February through May.

Auburn Ravine

The project-affected reach of Auburn Ravine extends downstream from the discharge from PG&E's South canal to Auburn Ravine downstream to the discharge from Auburn tunnel (non-project transfer from North Fork of the American River by PCWA). Under the existing license, there is no minimum flow requirement for releases from the Wise and Wise No. 2 Development to Auburn Ravine via South canal. The total hydraulic capacity of the Wise and Wise no. 2 powerhouses exceeds the hydraulic capacity of the South canal; excess volume can be released from South Canal at a spill gate to Auburn Ravine. Under the existing license water is released to Auburn Ravine at this location primarily to meet water delivery obligations and water rights of NID and PCWA. The historical range and seasonality of flows from the South canal to Auburn Ravine are summarized in table 3-62 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Peak historical median monthly flows are 287 to 300 cfs in December through March; median flows are at their lowest July and November. Monthly flow at the 10 percent exceedance from September through May range from 143 to 340 cfs.

Newcastle Development

Mormon Ravine

The Newcastle Development powerhouse is located at the terminus of the South canal. The Mormon Ravine reach is about 0.3 mile long between where flows from the Newcastle Development enter to the normal maximum water surface elevation of Folsom Lake. PCWA makes withdrawals from South canal at several locations between the Wise powerhouses and the Newcastle Development to exercise water rights and meet water delivery requirements. The Newcastle Development is the most downstream development of the Drum-Spaulding and Yuba-Bear Projects; flows through the Newcastle powerhouse for power generation are those in excess of water delivery requirements and upstream storage and minimum streamflow requirements. Under the existing license, the required minimum streamflow in Mormon Ravine below Newcastle powerhouse is 5 cfs; during an outage of the South canal, Bear River canal, Upper Wise canal, or Lower Wise canal there is no minimum streamflow in Mormon Ravine. The historical range and seasonality of flows from the Newcastle powerhouse to Mormon Ravine are summarized in table 3-63 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Peak historical median monthly flows are 221 to 278 cfs in December through April; median flows are 0 cfs in October and November and July and August. Monthly flow at the 10 percent exceedance from September through May range from 209 to 321 cfs.

Yuba-Bear Project

Water Storage

Bowman Development

Jackson Meadows Reservoir

Jackson Meadows reservoir has a maximum surface area of 1,008 acres, is 2.8 miles long, and has a maximum storage capacity of 67,641 acre-feet (usable storage is 67,435 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-64. Maximum drawdown occurs in November and December; highest median monthly reservoir storage occurs between May and August. The highest monthly storage at the 10 percent exceedance approaches maximum storage capacity between May and August. The reservoir shoreline is 9.9 miles long. Jackson Meadows reservoir is operated to capture and store the spring runoff from the Middle Yuba River watershed, which is about 37.3 square miles at Jackson Meadows reservoir, with the majority of water conveyed via the Middle Yuba River. Several small streams also drain into Jackson Meadows reservoir, including Pass Creek, Woodcamp Creek, and three unnamed tributaries. Historical releases to the Middle Yuba River have been made from Jackson Meadows reservoir to meet project storage and downstream flow requirements.

Milton Diversion Dam Impoundment

Milton diversion dam impoundment has a maximum surface area of 100 acres, is 0.4 mile long, and has a maximum and usable storage capacity of 275 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-65. Between May and October, median monthly storage is 189 to 193 acre-feet; during most of the rest of the year, storage is between 165 and 168 acre-feet. At the 10 percent exceedance, storage exceeds the storage capacity at 294 to 295 acre-feet in February through June. The reservoir shoreline is 1.3 miles long. The drainage area into Milton diversion dam impoundment is about 39.8 square miles, with the majority of inflows regulated by local accretion and releases from Jackson Meadows reservoir. Milton diversion dam

impoundment operates as a flow control feature, diverting up to 450 cfs into the Bowman-Spaulding conduit to Bowman Lake reservoir in the Canyon Creek sub-basin.

Jackson Lake

Jackson Lake has a maximum surface area of 52 acres, is 0.4 mile long, and has a maximum storage capacity of 1,334 acre-feet (usable storage is 975 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-66. Between May and September, median monthly storage is 1,000 to 1,330 acre-feet; during most of the rest of the year, storage is between 848 and 912 acre-feet. At the 10 percent exceedance, storage between February and July is at or above maximum storage capacity. The reservoir shoreline is 1.1 miles long. The reservoir is operated to capture and store the spring runoff from the Jackson Creek watershed, which is about 0.7 square mile at Jackson Lake. Inflow into Jackson Lake is unregulated, but because the reservoir acts as a storage reservoir for the Yuba-Bear Project, discharge into Jackson Creek is regulated. Water is normally released from Jackson Lake to Bowman Lake via the Jackson Lake dam spillway and a low-level outlet tunnel to Jackson Creek.

French Lake

French Lake has a maximum surface area of 356 acres, is 1.6 miles long, and has a maximum and usable storage capacity of 13,940 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-67. Between May and July, median monthly storage approaches maximum storage capacity; during most of the rest of the year, storage is between 6,700 and 12,000 acre-feet. At the 10 percent exceedance, storage between January and July is at or above maximum storage capacity. The reservoir shoreline is 5.3 miles long. The reservoir is operated to capture and store the spring runoff from Canyon Creek watershed, which is about 4.82 square miles at French Lake. Inflow into French Lake is unregulated, but because the reservoir acts as a major storage reservoir for the Yuba-Bear Project, discharge into Canyon Creek is regulated. Several small streams also drain into French Lake, including three unnamed tributaries, one of which originates from Baltimore Lake, a small non-project reservoir upstream of French Lake. Water is normally released from French Lake reservoir to Faucherie Lake via the French Lake dam spillway and a low-level outlet tunnel to Canyon Creek.

Faucherie Lake

Faucherie Lake has a maximum surface area of 150 acres, is 0.7 mile long, and has a maximum storage capacity of 3,980 acre-feet (usable storage is 3,740 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-68. Between January and September, median monthly storage approaches or exceeds maximum storage capacity. During most of the rest of the year, storage is between 3,230 and 3,721 acre-feet. At the 10 percent exceedance, storage during all months is at or above maximum storage capacity. The reservoir shoreline is 2.4 miles long. The drainage area into Faucherie Lake is 9.29 square miles, with the majority of inflows regulated by local accretion and releases from French Lake. Faucherie Lake is operated to capture and store spring runoff, and regulate discharges to Canyon Creek. There are no major tributaries contributing inflow to the reservoir. Water is normally released from Faucherie Lake to Sawmill Lake via the Faucherie Lake dam spillway and a low-level outlet tunnel to Canyon Creek.

Sawmill Lake

Sawmill Lake has a maximum surface area of 113 acres, is 0.8 mile long, and has a maximum and usable storage capacity of 3,030 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-69. Between January

and August, median monthly storage is at maximum capacity of Sawmill Lake; during most of the rest of the year, storage is between 2,727 and 2,860 acre-feet. At the 10 percent exceedance, storage during all months is at or above maximum storage capacity. The reservoir shoreline is 2.6 miles long. The drainage area into Sawmill Lake is 17.0 square miles, with the majority of inflows regulated by local accretion and releases from Faucherie Lake. South Fork is a major tributary contributing inflow to Sawmill Lake. The reservoir is operated to capture and store spring runoff, and to regulate discharges to Canyon Creek. Water is normally released from Sawmill Lake to Bowman Lake via the Sawmill Lake dam spillway and a low-level outlet tunnel to Canyon Creek.

Bowman Lake

Bowman Lake has a maximum surface area of 827 acres, is 2.6 miles long, and has maximum and usable storage capacity of 68,363 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-70. Peak monthly median storage occurs in June and July (60,500 to 64,300 acre-feet); from January to March, median storage is at about half of maximum capacity. At the 10 percent exceedance, storage during May through July is at or above maximum storage capacity. The reservoir shoreline is 7.6 miles long. The drainage area into Bowman Lake is 28.5 square miles, with the majority of inflows regulated by local accretion, releases from Sawmill Lake and Jackson Lake, and flow diverted through the Milton-Bowman diversion conduit. Bowman Lake is also the confluence point of two small unnamed streams in Poison Canyon on the southern side of the lake. Water is normally released from Bowman Lake to the Bowman-Spaulding conduit diversion impoundment, through Bowman powerhouse on Canyon Creek via the Bowman North dam low-level outlet and penstock. Minimum, mean, and maximum recorded daily flows through Bowman powerhouse are 0, 179.5, and 350 cfs, respectively. The Bowman-Spaulding conduit diversion impoundment diverts the majority of water released from Bowman Lake through the Bowman-Spaulding conduit to Lake Spaulding; however, the current license requires a minimum flow in Canyon Creek downstream of Bowman-Spaulding conduit diversion dam of 3 cfs from April 1 to October 31 and a minimum flow of 2 cfs from November 1 to March 31 in all water years.

Dutch Flat No. 2 Development

Dutch Flat no. 2 forebay has a maximum surface area of 8 acres, is 0.2 mile long, and has a maximum storage capacity of 177.9 acre-feet (usable storage is 160 acre-feet). PG&E did not present a storage frequency analysis for Dutch Flat no. 2 forebay. The reservoir shoreline is 0.5 mile long. The drainage area into Dutch Flat no. 2 forebay is 0.1 square mile. Inflows to Dutch Flat no. 2 forebay are highly regulated by releases from Drum afterbay. The forebay is operated as a run-of-river reservoir, regulating flow into Dutch Flat no. 2 powerhouse penstock. Water is normally released from Dutch Flat no. 2 forebay to Dutch Flat afterbay, through Dutch Flat no. 2 powerhouse via Dutch Flat no. 2 forebay dam spillway, low-level outlet, and penstock. Minimum, mean, and maximum recorded daily flows through Dutch Flat no. 2 powerhouse are 0, 197.5, and 610 cfs, respectively.

Chicago Park Development

Dutch Flat Afterbay

Dutch Flat afterbay has a maximum surface area of 38 acres, is 0.9 mile long, and has a maximum and usable storage capacity of 1,359.2 acre-feet. Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-71. The median storage (1,570 to 1,970 acre-feet) is in excess of the maximum storage capacity all year according to the PG&E analysis. The reservoir shoreline is 1.9 miles long. The drainage area into Dutch Flat afterbay is 21.2 square miles. Dutch Flat afterbay is operated as a re-regulating reservoir, regulating inflows from Drum afterbay, Dutch Flat no. 2 forebay, and Alta forebay. The majority of water is normally released

from Dutch Flat afterbay to Chicago Park forebay via the Chicago Park flume, and the remainder is released to Rollins reservoir on the Bear River via the Dutch Flat afterbay dam spillway and low-level outlet.

Chicago Park Forebay

Chicago Park forebay has a maximum surface area of 7 acres, is 0.3 mile long, and has a maximum and usable storage capacity of 103 acre-feet. PG&E did not present a storage frequency analysis for the Chicago Park forebay. The reservoir shoreline is 0.7 mile long. Inflows to Chicago Park forebay are highly regulated by releases from Dutch Flat afterbay. The reservoir is operated as a run-of-river reservoir, regulating flow into the Chicago Park powerhouse penstock. Water is normally released from Chicago Park forebay to Rollins reservoir on the Bear River via the Chicago Park forebay dam spillway, low-level outlet, and penstock. Minimum, mean, and maximum recorded daily flows through Chicago Park powerhouse are 0, 498.7, and 1,100 cfs, respectively (YB-258).

Rollins Development

Rollins reservoir has a maximum surface area of 788 acres, is 3.3 miles long, and has a maximum storage capacity of 58,682 acre-feet (usable storage is 54,453 acre-feet). Historical monthly storage for the period of record is summarized at the 10, 50 (median), and 90 percent exceedance values in table 3-72. Between March and May, median monthly storage approaches or exceeds maximum storage capacity. During most of the rest of the year, storage is between 36,000 and 58,400 acre-feet. At the 10 percent exceedance, storage during November through July is at or above maximum storage capacity. The reservoir shoreline is 19 miles long. The drainage area into Rollins reservoir is 104 square miles, with the majority of inflows highly regulated by releases from Dutch Flat afterbay and Chicago Park forebay. The reservoir is operated as a storage reservoir for irrigation, recreation, and power demands. Water is normally released from Rollins reservoir to the Bear River via the penstock to the Rollins powerhouse, the Rollins dam spillway, and low-level outlet, penstock, and the Bear River canal. Minimum, mean, and maximum recorded daily flow through Rollins powerhouse are 0, 545, 837.9 cfs, respectively (USGS gage 11421900/YB-279). The Bear River canal diversion dam diverts the majority of water released from Rollins reservoir through the Bear River canal to Halsey forebay; however, the current license requires a minimum flow in the Bear River downstream of Rollins dam of 75 cfs from May 1 to October 31 and 20 cfs from November 1 to April 30 in a normal year, and a minimum flow of 40 cfs from May 1 to October 31 and 15 cfs from November 1 to April 30 in a dry year.

Project-Affected Stream Reaches

Bowman Development

Middle Yuba River – Below Jackson Meadows Dam

Jackson Meadows dam reach is a 1.6-mile-long section of the Middle Yuba River that extends from the base of Jackson Meadows dam (El., 6,000 feet msl at RM, 47.1) to the normal maximum water surface elevation of Milton diversion dam impoundment (El. 5,690 feet msl at RM 45.5). The reach has a gradient of 3.9 percent. There are no storage or diversion dams upstream of Jackson Meadows reservoir. NID uses the reach primarily to transport water stored in Jackson Meadows reservoir to the Milton-Bowman diversion, where the water is diverted to Bowman Lake on Canyon Creek. Under the existing license, the minimum streamflow in this reach released from Jackson Meadows dam is 5 cfs year round. The historical range and seasonality of flows in this reach of Middle Yuba below Jackson Meadows dam are summarized in table 3-73 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows peak in September and October (144 to 146 cfs); lowest median flows occur from November to February (9 to

11 cfs). Median flows are relatively high (70 to 106 cfs) from March through August. Minimum monthly flows reflected by the 90 percent exceedance are 4.2 to 8.8 cfs throughout the year, with the lowest flows in December to February. Lowest monthly flow at the 10 percent exceedance occurs in January (91.5 cfs). Unregulated peak median flow is about 356 cfs in May. Lowest unregulated monthly median flows would be less than 20 cfs (July through December). Minimum unregulated flows (90 percent exceedance) are 5 cfs or less from July through November. The lowest unregulated flows at the 10 percent exceedance are less than 20 cfs in August through October.

Middle Yuba River Below Milton Diversion Dam

Milton diversion dam reach is a 32-mile-long section of the Middle Yuba River that extends from the base of Milton diversion dam impoundment (El. 5,653 feet msl at RM 44.8) to the normal maximum water surface elevation of YCWA's Our House diversion dam (El. 4,720 feet msl at RM 12.8). Channel gradient is 2.8 percent. NID uses the dam to divert water via the Milton-Bowman conduit to Bowman Lake on Canyon Creek. Water released from Milton diversion dam does not pass through any project powerhouses nor is it used to meet water deliveries by NID. Under the existing license, the minimum streamflow downstream of Milton diversion dam is 3 cfs year round. The historical range and seasonality of flows in this reach of Middle Yuba River below Milton diversion dam are summarized in table 3-74 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 3.6 to 4.0 cfs year round, with the minimum flow (3.6 cfs) in January. Minimum monthly flows reflected by the 90 percent exceedance are 2.0 to 3.4 cfs throughout the year, with the lowest flows in April and May. Relatively low monthly flows at the 10 percent exceedance occur in July through March (4.2 to 6.0 cfs). Estimated unregulated peak median flows are about 378 cfs in May. Lowest unregulated monthly median flows would be less than 10 cfs (August through November). The lowest unregulated flows at the 10 percent exceedance are less than 20 cfs in August through October. Minimum unregulated flows (90 percent exceedance) are less than 4 cfs from August through November.

Wilson Creek Below Wilson Creek Diversion Dam

Wilson Creek diversion dam reach extends from Wilson Creek diversion dam located on Wilson Creek (El. 5,690 feet msl at RM 0.3) to the confluence of Wilson Creek with the Middle Yuba River (El. 5,665 feet msl at RM 0.0). The gradient in the reach is 3.6 percent. Wilson Creek diversion dam was constructed in the mid 1980s and has no storage capability. Wilson Creek is an ephemeral creek with no upstream storage or diversion facilities. During spring, NID diverts water from the creek into the Milton-Bowman conduit. No minimum flow is required in this reach under the existing license. NID did not present a historical flow frequency analysis for Wilson Creek. Estimated unregulated median flows are 0.2 cfs or less from July through November (table 3-75). Minimum unregulated flows (90 percent exceedance) are 0 cfs from July through October. The lowest unregulated flows at the 10 percent exceedance are less than 6 cfs in July through February. Peak flows at the 10 percent exceedance are 11.3 to 22.0 cfs in March through June.

Jackson Creek Below Jackson Lake Dam

Jackson Lake dam reach is a 3.0-mile-long section of Jackson Creek that extends from the base of Jackson dam (El. 6,568 feet msl at RM 3.0) to the normal maximum water surface elevation of Bowman Lake (El. 5,562 feet msl at RM 0.0). The reach has a gradient of 6.9 percent. There are no upstream storage or diversion facilities. NID releases water from Jackson Lake into Bowman Lake. The minimum streamflow in this reach is 0.75 cfs year round under the existing license. The historical range and seasonality of flows in this reach of the Jackson Creek are summarized in table 3-76 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 1.2 to 1.6 cfs year round in this reach of Jackson

Creek. Minimum monthly flows reflected by the 90 percent exceedance are 0.9 to 1.0 cfs throughout the year. Monthly flows at the 10 percent exceedance are 1.7 to 2.0 cfs year round. Estimated unregulated median flows are 1 cfs or less from July through January and 1.4 to 9.7 cfs from February through June. The lowest unregulated flows at the 10 percent exceedance are less than 10 cfs in year round. Minimum unregulated flows (90 percent exceedance) are 0 cfs from July through November.

Canyon Creek Below French Lake Dam

French Lake dam reach is a 1.4-mile-long section of Canyon Creek that extends from the base of French dam (El. 6,590 feet msl at RM 18.4) to the normal maximum water surface elevation of Faucherie Lake (El. 6,123 feet msl at RM 17.0). The reach has a gradient of 7.3 percent. NID releases water from French Lake into Faucherie Lake. The minimum flow in this reach of Canyon Creek is 2.5 cfs year round under the existing license. The historical range and seasonality of flows in this reach of the Canyon Creek are summarized in table 3-77 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 2.9 to 3.2 cfs year round in this reach of Canyon Creek. Minimum monthly flows reflected by the 90 percent exceedance are 2.7 to 2.9 cfs throughout the year. Monthly flows at the 10 percent exceedance are 3.1 to 3.2 cfs year round. Estimated unregulated median flows are less than 2 cfs from July through November. Minimum unregulated flows (90 percent exceedance) are less than 1 cfs from July through December. The lowest unregulated flows at the 10 percent exceedance are less than 2.5 cfs in August through October.

Canyon Creek Below Faucherie Lake Dam

Faucherie Lake dam reach is a 1.8-mile-long section of Canyon Creek that extends from the base of Faucherie Lake dam (El. 6,058 feet msl at RM 16.5) to the normal maximum water surface elevation of Sawmill Lake (El. 5,860 feet msl at RM 14.7). The reach has a gradient of 3.3 percent. NID releases water from Faucherie Lake into Sawmill Lake. The minimum flow in this reach of Canyon Creek is 2.5 cfs year round under the existing license. The historical range and seasonality of flows in this reach of the Canyon Creek are summarized in table 3-78 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 2.9 to 3.0 cfs year round in this reach of Canyon Creek. Minimum monthly flows reflected by the 90 percent exceedance are 2.7 to 2.9 cfs throughout the year except for 1.3 cfs in September. Monthly flows at the 10 percent exceedance are 3.1 to 3.3 cfs year round. Estimated unregulated median flows are less than 2.5 cfs from July through November. Minimum unregulated flows (90 percent exceedance) are less than 1 cfs from July through November. The lowest unregulated flows at the 10 percent exceedance are less than 5 cfs in August through October.

Canyon Creek Below Sawmill Lake Dam

Sawmill Lake dam reach is a 0.8-mile-long section of Canyon Creek that extends from the base of Sawmill Lake dam (El. 5,800 feet msl at RM 14.0) to the normal maximum water surface elevation of Bowman Lake (El. 5,562 feet msl at RM 13.2). The reach has a gradient of 6.9 percent. NID releases water from Sawmill Lake into Bowman Lake. The minimum flow in this reach of Canyon Creek is 2.5 cfs year round under the existing license. The historical range and seasonality of flows in this reach of Canyon Creek are summarized in table 3-79 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 3.5 to 4.2 cfs year round in this reach of Canyon Creek. Minimum monthly flows reflected by the 90 percent exceedance are 2.8 to 3.0 cfs throughout the year. Monthly flows at the 10 percent exceedance are 6.1 to 9.5 cfs in February through July; flows from August to December are 29 to 57 cfs, except for 6.5 cfs in October. Estimated unregulated median flows are less than 3.0 cfs or less from July through October. Minimum unregulated flows (90 percent exceedance) are less than 1 cfs

from July through October. The lowest unregulated flows at the 10 percent exceedance are 4 to 5 cfs in August and September.

Canyon Creek Below Bowman Dam

Bowman dam and powerhouse (El. 5,569 feet msl at RM 10.4) release directly into the Bowman-Spaulding diversion dam impoundment, which is only a few hundred feet long. No minimum streamflow is required under the existing license. NID did not present a flow frequency analysis for the releases to the Bowman-Spaulding diversion impoundment.

Dutch Flat No. 2 Development

Canyon Creek Below Bowman-Spaulding Diversion Dam

Bowman-Spaulding diversion dam reach is a 10.5-mile-long section of Canyon Creek that extends from the base of Bowman-Spaulding diversion dam (El. 5,379 feet msl at RM 10.5) to the South Yuba River confluence (El. 2,840 feet msl at RM 0.0). The reach has a gradient of 4.2 percent. The existing license requires a minimum stream flow of 3 cfs between April 1 and October 31 and 2 cfs between November 1 and March 31. The historical range and seasonality of flows in this reach of the Canyon Creek are summarized in table 3-80 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows are 4.1 cfs (November) to 6.3 cfs (March) in this reach of Canyon Creek. Minimum monthly flows reflected by the 90 percent exceedance are 2.1 to 3.3 cfs throughout the year. Monthly flows at the 10 percent exceedance are 10 cfs or less from July through December. Estimated unregulated median flows are less than 10 cfs from July through November. Minimum unregulated flows (90 percent exceedance) are less than 10 cfs from June through January. The lowest unregulated flows at the 10 percent exceedance are less than 10 cfs in August to September.

Texas Creek Below Texas Creek Diversion Dam

Texas Creek diversion dam reach is a 0.6-mile-long section of Texas Creek that extends from the base of Texas Creek diversion dam (El. 5,365 feet msl at RM 0.6) to the Texas Creek confluence with Canyon Creek (El. 4,640 feet msl at RM 0.0). Texas Creek diversion dam has no appreciable storage. The reach has a gradient of 24.2 percent. PG&E's Drum-Spaulding Project's Upper Rock, Lower Rock, Culbertson, Upper Lindsey, Middle Lindsey, and Lower Lindsey Lakes are upstream of the Texas Creek diversion dam. NID diverts water from Texas Creek into the Bowman-Spaulding conduit. No minimum streamflow is required for this reach of Texas Creek under the existing license. NID did not present a frequency analysis for historical flows in this reach of Texas Creek. The range and seasonality of estimated unregulated flows in this reach of the Texas Creek are summarized in table 3-81 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Unregulated median flows are less than 10 cfs from July through January. Minimum unregulated flows (90 percent exceedance) are less than 5 cfs from June through January. The lowest unregulated flows at the 10 percent exceedance are less than 3 cfs in August through October.

Clear Creek Below Bowman-Spaulding Conduit

Clear Creek below Bowman-Spaulding conduit reach is a 0.9-mile-long section of Clear Creek that extends from the Bowman-Spaulding conduit (El. 5,360 feet msl at RM 0.9) to the Clear Creek confluence with Fall Creek (El. 5,200 feet msl at RM 0.0). The reach has a gradient of 3.7 percent. The Clear Creek Basin upstream of Bowman-Spaulding conduit does not have any reservoirs, diversions, or inflows from man-made facilities, and the creek is dry each year during summer-fall. Water from upstream in Clear Creek flows into the Bowman-Spaulding conduit, and excess water is released back

into Clear Creek at a conduit dump gate. No minimum streamflow is required for the downstream reach of Clear Creek under the existing license. NID did not present a frequency analysis for historical flows in this reach. The range and seasonality of estimated unregulated flows in this reach are summarized in table 3-82 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Estimated unregulated median flows are less than 8 cfs from June through March. Minimum unregulated flows (90 percent exceedance) are less than 5 cfs year round except in April (5.8 cfs). The lowest unregulated flows at the 10 percent exceedance are less than 6 cfs in July through November.

Fall Creek Below Fall Creek Diversion Dam

Fall Creek diversion dam reach is a 1.3-mile-long section of Fall Creek that extends from the base of Fall Creek diversion dam (El. 5,363 feet msl at RM 2.0) to the Fall Creek confluence with the South Yuba River (El. 3,200 feet msl at RM 0.0). Fall Creek diversion dam has no appreciable storage. The reach has a gradient of 20.9 percent. PG&E's Drum-Spaulding Project's Feeley and Carr Lakes are upstream of the Fall Creek diversion dam. NID diverts water from Fall Creek into the Bowman-Spaulding conduit. No minimum streamflow is required for this reach under the existing license. The historical range and seasonality of flows in this reach of the Canyon Creek are summarized in table 3-83 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows range from 0.4 cfs (January and February) to 2.2 cfs (November) in this reach of Fall Creek. Minimum monthly flows reflected by the 90 percent exceedance are 0.3 to 0.7 cfs throughout the year. Monthly flows at the 10 percent exceedance are 5 cfs or less from June through March, with peak flow of 294 to 415 cfs in April and May. Estimated unregulated median flows are less than 1 cfs from July through January with no flow from August through November. Minimum unregulated flows (90 percent exceedance) are 2 cfs or less year round. The lowest unregulated flows at the 10 percent exceedance are less than 2 cfs in July through November.

Trap Creek Below Bowman-Spaulding Conduit

Trap Creek below Bowman-Spaulding conduit is a 1.2-mile-long reach of Trap Creek that extends from the Bowman-Spaulding conduit (El. 5,360 feet msl at RM 1.2) to the Trap Creek confluence with Fall Creek (El. 3,600 feet msl at RM 0.0). The reach has a gradient of 27.6 percent. The Trap Creek Basin upstream of Bowman-Spaulding conduit does not have any reservoirs, diversions, or inflows from man-made facilities, and the creek runs dry each year. Water in Trap Creek flows into the Bowman-Spaulding conduit, and excess water is released back into Trap Creek at a conduit dump gate. No minimum streamflow is required for this reach under the existing license. NID did not present a frequency analysis for historical flows in this reach. The range and seasonality of estimated unregulated flows in this reach are summarized in table 3-84 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Estimated unregulated median flows are less than 2 cfs from June through February. Minimum unregulated flows (90 percent exceedance) are less than 2 cfs year round except in April (2.3 cfs). The lowest unregulated flows at the 10 percent exceedance are less than 6 cfs in July through February.

Rucker Creek Below Bowman-Spaulding Conduit

Rucker Creek below Bowman-Spaulding conduit is a 1.2-mile-long reach of Rucker Creek that extends from the Bowman-Spaulding conduit (El. 5,360 feet msl at RM 1.2) to the confluence of Rucker Creek with the South Yuba River (about El. 3,630 feet msl at RM 0.0). The reach has a gradient of 26.1 percent. PG&E's Drum-Spaulding Project's Blue and Rucker Lakes are upstream of the Bowman-Spaulding conduit. Water in Rucker Creek flows into the Bowman-Spaulding conduit, and excess water is released into Rucker Creek at an upstream conduit dump gate. No minimum streamflow is required for

this reach under the existing license. NID did not present historical monthly streamflow in this reach. Estimated unregulated data in table 3-85 indicate that the median monthly would be 0.2 cfs or less between July and October, with the peak median flow in April and May (15.7 to 20.9 cfs). Peak monthly unregulated flows at the 10 percent exceedance are generally two to six times the median flows.

Chicago Park Development

Steephollow Creek

Emergency spills from the Chicago Park conduit into Steephollow Creek to evacuate the conduit during outages occur infrequently, but can produce elevated flows in Steephollow Creek for short periods. The existing license does not have flow requirements for Steephollow Creek, and no information on historical or unregulated flow frequency is available.

Bear River Below Dutch Flat Afterbay Dam

Dutch Flat afterbay dam reach is a 5.4-mile-long section of Bear River that extends from the base of Dutch Flat afterbay dam (El. 2,590 feet msl at RM 21.3) to the Chicago Park powerhouse tailrace (El. 2,240 feet msl at RM 15.9). Dutch Flat afterbay dam was constructed from 1964 through 1965 and has a usable storage of 1,359.2 acre-feet. The reach has a gradient of 1.3 percent. PG&E's Drum-Spaulding Project's Drum afterbay is upstream. NID diverts water from the Dutch Flat afterbay to Chicago Park powerhouse via the Chicago Park conduit. Under existing conditions, minimum flows in the Bear River below Dutch Flat afterbay are 10 cfs between May 1 and October 31 and 5 cfs between November 1 and April 30. The historical range and seasonality of flows in this reach of the Canyon Creek are summarized in table 3-86 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Historical median monthly flows range from 6.5 to 7.1 cfs (November through April) to 11 to 12 cfs (May through October) in this reach of Bear River. Minimum monthly flows reflected by the 90 percent exceedance are 5.2 to 6.3 cfs from November through July and 9.7 to 10 cfs from August through October. Monthly flows at the 10 percent exceedance are 16 cfs or less from October through February and in May and June with peak flow of 71 to 128 cfs in March and April. Estimated unregulated median flows are less than 20 cfs from July through December. Minimum unregulated flows (90 percent exceedance) are 10 cfs from June through December. The unregulated flows at the 10 percent exceedance are greater than 150 cfs from January through May and less than 20 cfs in August through October.

Bear River – Below Chicago Park Powerhouse

Chicago Park powerhouse reach is a 1.5-mile-long section of the Bear River from the Chicago Park powerhouse tailrace (El. 2,240 feet msl at RM 15.9) to the normal maximum water surface elevation of Rollins reservoir (El. 2,171 feet msl at RM 14.4). Chicago Park powerhouse is the project's only peaking facility. Releases and spills at Dutch Flat afterbay dam, as well as accretion in a 5.4-mile-long section of the Bear River upstream of the powerhouse, flow unimpeded past the powerhouse. This section of stream has been severely disturbed by historic hydraulic mining activity. The reach is a low gradient, braided channel due to high sediment supply from hydraulic mining. The original valley is filled with cobble and gravel materials excavated during hydraulic mining. Subsurface flow is common and deep pools are infrequent. Deposition is further enhanced in the lower 0.5 mile due to backwater effect from Rollins reservoir, where sinuosity and anastomosing is increased, and sands and silts are deposited. No minimum flow is specified for this reach in the existing license. NID did not present a separate flow frequency analysis for this reach.

Rollins Development

Bear River Below Rollins Dam

Rollins dam and powerhouse (El. 1,960 feet msl at RM 10.5) release water directly into the PG&E Drum-Spaulding Project's Bear River canal diversion dam impoundment, which is only a few hundred feet long. Water that passes the Bear River canal diversion dam (approximate El. 1,960 feet msl at RM 10.4) flows downstream 10.4 miles to NID's Lake Combie (approximate El. 1,600 feet msl at RM 0.0), a non-project facility. Two sets of minimum flow requirements under the existing license are specified: normal or wet years; and dry years. From May 1 through October 31, the minimum streamflow is 75 cfs in normal or wet years and 40 cfs in dry years. From November 1 through April 30, the minimum flow is 20 cfs in normal or wet years and 15 cfs in dry years. The historical range and seasonality of flows in this reach of the Bear River are summarized in table 3-87 in terms of median (50th percentile) and upper and lower 10th percentile range of flows for the period of record under the existing license. Highest historical median monthly flows occur from January through June (234 to 585 cfs) in this reach of the Bear River; flows from September through December are 100 cfs or less. Lowest minimum monthly flows reflected by the 90 percent exceedance occur from November through April (19 to 24 cfs); flows are greater than 65 cfs from May through October. Monthly flows at the 10 percent exceedance are greater than 1,200 cfs from January through April and greater than 290 cfs the rest of the year. Estimated unregulated median flows are less than 60 cfs from July through November. Minimum unregulated flows (90 percent exceedance) are less than about 21 cfs from July through October and are highest in March and April (129 to 134 cfs). The unregulated flows at the 10 percent exceedance are about 1,000 cfs in March and less than 70 cfs in August through October.

Water Rights and Other Water Uses

Historically, one of the primary purposes/uses of many of the Yuba-Bear and Drum-Spaulding Projects' facilities has been for delivery of water across sub-watersheds for uses other than hydropower generation; e.g., municipal and domestic water supply, agriculture and irrigation, mineral extraction, and other industrial uses. NID and PCWA are the principal non-hydropower purveyors of water used and distributed through the project facilities. NID points out in responding to comments on the amended final license application (docket filing 20120914-5152) that:

Whether or not the Project is operated for hydropower production, NID's water rights entitle NID to continue to direct the water in a manner identical to that proposed for licensing... the Commission's issuance of a new license for the Project – or its denial – will not change NID's water operations in this basin, which give consumptive demands a higher priority than hydropower production.

The Water Commission Act of 1914, a predecessor to today's California Water Code provisions governing water appropriation, created the State Water Rights Board, which evolved into the California Water Board, which has the authority to administer permits and licenses for surface water use. An appropriative water right is a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use. The holder of an appropriative water right does not own the water but simply holds the right to use it. NID and PG&E hold a combination of pre- and post-1914 appropriative rights related to these two projects for various beneficial uses, including domestic, irrigation, industrial, municipal, hydroelectric power, recreation, and mining (tables 3-88 and 3-89, respectively). The majority of these appropriative rights are for multiple uses in addition to power generation. NID holds post-1914 water rights for project storage of more than 603,000 acre-feet seasonally and diversion of 4,269 cfs distributed among various conduits and canals. PG&E holds pre- and post-1914 water rights for storage of more than 171,800 acre-feet seasonally and diversion of 2,627 cfs distributed among various conduits and canals. Many of these rights are exercised through

within-basin (e.g., Dutch Flat no. 2 flume and Chicago Park flume on the Bear River) and out-of-basin (e.g., Milton-Bowman diversion conduit from the Middle Yuba River, Lake Valley canal from the North Fork of the North Fork American River, and Bear River canal from the Bear River) water transfers.

3.3.2.1.2 Water Quality

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) defines water quality criteria for the Sacramento River and its tributaries and formally designates existing and potential beneficial uses and water quality objectives. The designated beneficial uses for the project areas consist of municipal and domestic water supply; agricultural supply; hydropower generation; water contact and non-contact recreation; cold freshwater habitat; warm freshwater habitat; wildlife habitat; and migration, spawning, reproduction, and/or early development of aquatic organisms. Water quality objectives are listed in the Central Valley Water Board's *Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Basin Plan). They include: bacteria, biostimulatory substances, chemical constituents, dissolved oxygen (DO), floating material, oil and grease, pH, sediment and settleables, tastes and odors, temperature, toxicity, turbidity, color, and pesticides.⁶

Because most water quality objectives provided in the Basin Plan are narrative, to assess the consistency of applicant-derived analytical data with beneficial uses, PG&E and NID identified numeric standards, criteria, and benchmarks that could be correlated with each beneficial use (PG&E and NID, 2010a). Provided in table 3-90, the selected values were primarily from the California Toxics Rule (EPA, 2000, as cited in PG&E and NID, 2010a) and the numeric water quality objectives of the Basin Plan (Central Valley Water Board, 1998), which incorporates the title 22 drinking water standards by reference.⁷ When an analyte did not have a corresponding standard or criterion in either the California Toxics Rule or the Basin Plan, benchmarks were excerpted from *A Compilation of Water Quality Goals* (Marshack, 2003, as cited in PG&E, 2011a, and NID, 2011a), *Water Quality Standards for Recreational Waters* (EPA, 2003, as cited in PG&E, 2011a and NID, 2011a), and other sources as noted in table 3-90.

Mormon Ravine (Newcastle Development) and Auburn Ravine (Wise and Wise No. 2 Development) reaches affected by the Drum-Spaulding Project are not listed under section 303(d) of the Clean Water Act as impaired water bodies. However, the Middle Yuba River, South Yuba River, Bear River, North Fork of the North Fork American River, and Deer Creek are listed under section 303(d) of the Clean Water Act as impaired water bodies as a result of mercury concentrations, with resource extraction as the probable sources of impairment. The South Yuba River (Spaulding No. 1 and No. 2 Development of the Drum-Spaulding Project) is also listed as impaired for temperature with no identified source of impairment.

⁶ Resource agencies did not request that PG&E or NID measure color or pesticides during relicensing studies. PG&E and NID are unaware of any instances where the color of the water in the vicinity of the projects has been reported as a potential problem. Similarly, significant pesticide use does not occur within the study area or in association with project operations and maintenance.

⁷ The U.S. Environmental Protection Agency (EPA) has established National Primary Drinking Water Regulations that set mandatory water quality standards for drinking water contaminants. These are enforceable standards called "maximum contaminant levels" or "MCLs," which are established to protect the public against consumption of drinking water contaminants that present a risk to human health. An MCL is the maximum allowable amount of a contaminant in drinking water that is delivered to the consumer (i.e., at the tap). In addition, EPA has established National Secondary Drinking Water Regulations that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" or "SMCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor (U.S. EPA, 2012).

Water Quality Standards

Water quality in the project areas was determined to be high and in accordance with the following seven basin plan objectives: biostimulatory substances; chemical constituents; color; pesticides; floating material; oil and grease; and sediment and settleable solids. However, a few inconsistencies were observed for the seven remaining Basin Plan objectives. Monitoring results and observed exceedances are summarized below.

Bacteria

The state water quality criteria for the protection of waters used for water contact recreation are based on the collection of a minimum of 5 fecal coliform samples within a 30-day period. All of the 2008 samples from the 20 recreation sites sampled had fecal coliform counts below the Basin Plan objective, but the following 5 recreation sites had total coliform counts above the benchmark: the north shore campsites at Carr Lake (Drum-Spaulding Project, Spaulding No. 3 Development); the informal campground boat launch at Lower Lindsey Lake (Spaulding No. 3 Development); and Long Ravine, Orchard Springs, and Greenhorn campgrounds at Rollins reservoir (Yuba-Bear Project, Rollins Development). These findings were confirmed in the 2009 study.

Dissolved Oxygen

Generally, measured DO levels in project-affected waters remained above the 7 milligrams per liter (mg/L) Basin Plan standard for cold water fisheries in all but 16 of the more than 100 samples. The 16 samples were collected from 10 separate locations. DO was less than the Basin Plan standard in the following study and project-affected stream reaches: the reach below Lake Sterling dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) in both spring and summer 2008; the reach below Lake Spaulding (Spaulding No. 1 and No. 2 Development) in fall 2009; the reach below Rock Creek reservoir (Drum-Spaulding Project, Wise and Wise No. 2 Development) in summer 2009; and Greenhorn Creek, a non-project-affected reach above Rollins reservoir in spring 2008. DO levels were less than 7 mg/L in the following project reservoirs: hypolimnion of Jackson Meadows reservoir (Bowman Development) in summer 2008 and fall 2009; Sawmill Lake (Bowman Development) in July 2008; Bowman Lake (Bowman Development) in August 2008, and August and September 2009; Rollins reservoir (Rollins Development) in summer and fall 2009; Blue Lake (Spaulding No. 3 Development) in summer 2009; and Lake Spaulding in summer and fall 2009.

pH

Measured pH values were within the Basin Plan criterion of 6.5 to 8.5 standard units in all but 6 of the more than 100 samples collected. Four of the samples from project-affected stream reaches were between 6.0 and 6.4 standard units. In spring 2008, measured pH levels were less than the Basin Plan standard in the following study and project-affected stream reaches: Fordyce dam reach below Fordyce Lake (Spaulding No. 1 and No. 2 Development); Greenhorn Creek above Rollins reservoir; Chicago Park reach above Rollins reservoir (Yuba-Bear Project); and Bowman-Spaulding conduit below Fuller Lake (Spaulding No. 3 Development). Within project reservoirs, pH levels were less than 6.5 standard units in one sample from the hypolimnion of Blue Lake (Spaulding No. 3 Development) in summer 2008 and above 8.5 standard units near the bottom of Lake Spaulding (Spaulding No. 1 and No. 2 Development) in fall 2009.

Tastes and Odors

Iron concentrations were below the Basin Plan criterion of 0.3 mg/L in all but 6 of the more than 100 samples. Iron concentrations were above the Basin Plan criterion in the following project-affected

stream reaches: Mormon Ravine reach (Newcastle Development) in spring 2008; South Yuba River below Spaulding dam reach (Spaulding No. 1 and No. 2 Development) in summer and fall 2008; Rock Creek below Rock Creek reservoir (Wise and Wise No. 2 Development) in spring and summer 2009; and Bear River canal diversion dam reach below Rollins reservoir (Rollins Development) in fall 2008.

Toxicity

Water quality objectives for aquatic toxicity are not included in the Basin Plan for the Bear and Yuba Rivers. Therefore, aquatic toxicity criteria from the EPA's California Toxics Rule (U.S. EPA, 2000) were used to evaluate aquatic toxicity in the project area. When a California Toxics Rule criterion was not available for a specific analyte, an aquatic life protective benchmark was selected from Marshack (2003), *A Compilation of Water Quality Goals* and other sources. Each sample was analyzed for 12 metals, including mercury and methylmercury, for both the total and dissolved fractions. Aluminum was found above the aquatic benchmark of 0.087 mg/L in 5 of the more than 100 samples. Four of the samples were taken from Halsey afterbay (Wise and Wise No. 2 Development) dam reach in spring 2008; Mormon Ravine (Newcastle Development) reach in spring and fall 2008; and Bear River canal diversion dam reach below Rollins reservoir (Rollins Development) in fall 2008. Aluminum concentrations were above the benchmark in the hypolimnion of Jackson Meadows reservoir (Bowman Development) in spring 2008.

Water hardness in the project area ranged from 4.8 to 26.6 mg/L in the spring, 1.6 to 32 mg/L in the summer, and 3.2 to 80 mg/L in the fall. Bioavailability of some metals increases at lower hardness levels; therefore, PG&E and NID calculated California Toxics Rule criteria for specific samples for cadmium, chromium, copper, lead, nickel, silver, and zinc to compare to laboratory results. Dissolved copper was found to be the only metal with concentrations greater than the sample-specific California Toxics Rule criterion. Only 4 of the 49 spring 2008 samples exhibited dissolved copper concentration above the California Toxics Rule criterion, and 20 of the 49 summer 2008 samples exhibited dissolved copper concentrations above the criterion. Only 10 samples were analyzed in fall 2008, of which only 1 exhibited copper concentrations above the California Toxics Rule criterion.

Stream Reach Temperatures

The water temperature in the majority of project-affected streams is generally cold, with mean daily water temperatures of less than 20°C. Therefore, the majority of project-affected streams support a coldwater trout fishery. However, at lower elevations, the Middle Yuba River, South Yuba River, and Bear River can exhibit slightly warmer temperatures. The following five stream reaches had mean daily water temperatures that exceeded 20°C (generally considered to be near the upper limit of the optimum temperature range for trout) and instantaneous maximum temperatures above 25°C (the approximate lethal thermal threshold of rainbow trout for a limited exposure time).

Milton Diversion Dam Reach; Yuba-Bear Project, Bowman Development (Middle Yuba River Below Wolf Creek)—Three monitoring sites were located within this reach: Middle Yuba River above Kanaka Creek confluence; Kanaka Creek above Middle Yuba River confluence; and Middle Yuba River above Our House diversion impoundment (non-project, FERC Project no. 2246). Of the 277 total days monitored in 2008 and 2009 in the Middle Yuba River above the Kanaka Creek confluence, 124 days had a mean daily temperature above 20°C, and 19 days had an instantaneous maximum temperature above 25°C. Of the 312 total days monitored in 2008 and 2009 in Kanaka Creek above the Middle Yuba River confluence, 58 days had a mean daily water temperature above 20°C, but the instantaneous maximum temperature was always below 25°C. Of the 313 days monitored in the Middle Yuba River above Our House diversion impoundment, 149 days had a mean daily temperature above 20°C, and about 73 days had an instantaneous maximum temperature above 25°C.

Rucker Creek Below Blue and Rucker Lakes (Drum-Spaulling Project, Spaulding No. 3 Development)—Two monitoring sites were located within this reach of Rucker Creek: Rucker Creek above Rucker Lake and Rucker Creek between the Yuba-Bear Project's Bowman-Spaulling conduit and Rucker Lake. Of the 276 total days monitored in 2008 and 2009 at Rucker Creek above Rucker Lake, 66 days had a mean daily water temperature above 20°C. Of the 207 total days monitored in Rucker Creek above Bowman-Spaulling conduit, only 4 days had a mean daily water temperature above 20°C. There were no days during the monitoring efforts when instantaneous maximum water temperature exceeded 25°C in either reach. Water temperatures downstream appear to benefit from regulation in Rucker Lake, which results in a reduced frequency of higher temperatures in Rucker Creek below Rucker Lake.

Spaulding Dam Reach of South Yuba River Above Canyon Creek Confluence (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development and Spaulding No. 3 Development)—Mean daily water temperatures were greater than 20°C in the South Yuba River immediately above the confluence with Canyon Creek in June through September 2008 and 2009. Of the 348 total days monitored at this location, 128 days had a mean daily water temperature greater than 20°C, and only 6 days had an instantaneous maximum water temperature above 25°C.

Canyon Creek Between South Yuba River and Texas Creek Confluence (Drum-Spaulling, Spaulding No. 3 Development; Yuba-Bear Project, Bowman Development)—From July through August in both the 2008 and 2009 monitoring efforts, Canyon Creek 0.1 mile upstream of the South Yuba River had mean daily water temperatures that exceeded 20°C. Of the 350 total days monitored at this location, 60 days had a mean daily water temperature greater than 20°C, but there were no days with an instantaneous maximum water temperature that exceeded 25°C.

Bear River Between Dutch Flat Afterbay and Chicago Park Powerhouse (Yuba-Bear Project, Chicago Park Development)—Three monitoring sites were located within this reach of the Bear River: Bear River below Dutch Flat afterbay; Bear River above Chicago Park powerhouse inflow; and Steephollow Creek above Bear River confluence. Of the 170 total days monitored at the Bear River station below Dutch Flat afterbay, there were no days with mean daily water temperatures above 20°C. Farther downstream, however, in the Bear River above the Chicago Park powerhouse discharge, 39 of the 300 monitored days had mean daily water temperature above 20°C. The Steephollow Creek station recorded a mean daily water temperature above 20°C on 14 of the 249 monitored days in 2008 and 2009. There were no days at any of these stations with instantaneous maximum water temperatures greater than 25°C.

Reservoir Temperatures

The Drum-Spaulling and Yuba-Bear Projects together have 40 reservoirs or impoundments. Twenty-four of the reservoirs are small diversion impoundments with less than 1,000 acre-feet of storage, and 28 of the reservoirs are located at elevations above 5,000 feet. During the winter, nearly all of these waterbodies ice over except Jackson Meadows reservoir (Yuba-Bear Project), Bowman Lake (Yuba-Bear Project), Drum afterbay (Drum-Spaulling Project), Dutch Flat afterbay (Yuba-Bear Project), Rollins reservoir (Yuba-Bear Project), Halsey afterbay (Drum-Spaulling Project), Rock Creek reservoir (Drum-Spaulling Project), and all project forebays. From June through August 2008 and 2009, the applicants collected vertical water temperature profiles in eight of the larger reservoirs (listed by sub-basin from north to south): Jackson Meadows reservoir (Yuba-Bear Project, Bowman Development); Sawmill Lake (Yuba-Bear Project, Bowman Development); Bowman Lake (Yuba-Bear Project, Bowman Development); Meadow Lake (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development); Fordyce Lake (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development); Lake Spaulding (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development); Lake Valley reservoir (Drum-

Spaulding Project, Drum No. 1 and No. 2 Development); and Rollins reservoir (Yuba-Bear Project, Rollins Development). Reservoir water temperatures were collected at four additional stations in Dutch Flat afterbay (Yuba-Bear Project, Chicago Park Development), Chicago Park forebay (Yuba-Bear Project, Chicago Park Development), Rock Creek reservoir (Drum-Spaulding Project, Wise and Wise No. 2 Development), and Wise forebay (Drum-Spaulding Project, Wise and Wise No. 2 Development). In order to determine temperature compliance within project reservoirs, the applicants used the same 20°C criterion used for streams, with the assumption that reservoir temperatures at low-level outlets and powerhouse intakes are most relevant to conformance with the 20°C threshold for downstream stream reaches. The following seven project reservoirs had water temperatures greater than 20°C.

Jackson Meadows Reservoir (Yuba-Bear Project, Bowman Development)—Water quality conditions, including temperatures, in Jackson Meadows reservoir support a coldwater trout-dominated fishery. Although project operations influence seasonal water quality conditions in Jackson Meadows reservoir, and water temperatures in the Middle Yuba River are affected by releases from Jackson Meadows reservoir, the majority of water temperature measurements taken during the 2009 monitoring effort was well within the optimum temperature range of salmonids and generally met Basin Plan criteria. Surface water temperatures in Jackson Meadows reservoir ranged from 12.5°C in October to 20.2°C in July, and bottom temperatures ranged from 4.8°C to 5.4°C during this timeframe.

The stratification period in Jackson Meadows reservoir typically extends from July to September. Reservoir temperature profiles in July, August, and September 2009 were characterized by a 25- to 30-foot epilimnion, a 20- to 25-foot thermocline (metalimnion) characterized by sharply reduced temperatures with depth, and a 60- to 80-foot thermally stable hypolimnion. A coldwater pool, operationally defined as all depths exhibiting water temperatures less than 10°C, ranged in volume from 4,855 acre-feet in October to 29,628 acre-feet in July 2009.

Minimum flow releases from Jackson Meadows dam to the Middle Yuba River are withdrawn from a low-level outlet near the bottom of the reservoir. Water temperatures at the outlet elevation throughout the 2009 monitoring effort ranged from about 5°C in July to 10°C in October. The majority of water released from Jackson Meadows reservoir is diverted into the Milton-Bowman diversion conduit.

Sawmill Lake Reservoir (Yuba-Bear Project, Bowman Development)—Water quality conditions in Sawmill Lake, including temperatures, support a coldwater fishery. Project operations influence seasonal water quality conditions in Sawmill Lake, and water temperatures in the downstream reach of Canyon Creek are affected by releases from the reservoir. Water temperature measurements ranged from 21.2°C at the surface to 17.2°C at the bottom in July 2008 and from 21.7°C at the surface to 13.2°C at the bottom in July 2009. Surface temperatures slightly exceed the optimum temperature range of salmonids and the Basin Plan criteria but deeper water temperatures are consistent with the Basin Plan.

Reservoir temperature profiles in July 2008 and 2009 were characterized by a 20- to 25-foot epilimnion, a 10-foot thermocline, and a 15-foot thermally stable hypolimnion. It is unknown how this stratification changes through the summer season into fall, because only one temperature profile was taken during the 2008 and 2009 monitoring efforts.

Minimum flow releases from Sawmill Lake dam to Canyon Creek are withdrawn from a low-level outlet near the bottom of the reservoir. Water temperatures at the outlet elevation were about 16.1°C and 13°C in July 2008 and July 2009, respectively. Releases from Sawmill Lake are routed via Canyon Creek to Bowman Lake.

Fordyce Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development)—Water quality conditions in Fordyce Lake, including temperatures, support a predominantly rainbow and brown trout coldwater fishery. Although project operations influence seasonal water quality conditions in

Fordyce Lake, and water temperatures in downstream reaches of Fordyce Creek are affected by releases from Fordyce Lake, the water temperature measurements taken in 2008 and 2009 were well within the optimum temperature range of rainbow and brown trout and met Basin Plan criteria. In 2008, surface water temperatures in Fordyce Lake ranged from 13.6°C in October to 18.9°C in July, and bottom temperatures ranged from 6.3°C in July to 7.8°C in October. In 2009, surface water temperatures ranged from 9.1°C in October to 20.2°C in July, and bottom temperatures ranged from 7.5°C in July to 11.2°C in August.

The reservoir temperature profiles in July, September, and October 2008 were characterized by a moderately deep 20- to 55-foot epilimnion, a 5- to 20-foot thermocline characterized by sharply reduced temperatures with depth, and a 10- to 55-foot thermally stable hypolimnion. Reservoir temperature profiles in July through October 2009 were characterized by a 15- to 30-foot epilimnion, a 10- to 25-foot thermocline, and a 10- to 30-foot hypolimnion. A coldwater pool, operationally defined as all depths exhibiting water temperatures less than 10°C, ranged in volume in 2008 from 1,400 acre-feet in October to 20,600 acre-feet in July, and in 2009 from 1,600 acre-feet in September to 12,300 acre-feet in July 2009.

Minimum flow releases from Fordyce Lake dam to Fordyce Creek are withdrawn from a low-level outlet near the bottom of the reservoir. Water temperature at the outlet elevation throughout the 2008 and 2009 monitoring efforts ranged from 6.3°C in October 2008 to 11.2°C in August 2009. Releases from Fordyce Lake are routed via Fordyce Creek to Lake Spaulding.

Lake Spaulding (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development)—Water quality conditions in Lake Spaulding, including temperatures, support a predominantly rainbow and brown trout coldwater fishery. Although project operations influence seasonal water quality conditions in Lake Spaulding, and water temperatures in the South Yuba River, South Yuba canal, Drum canal, and Bear River are affected by releases from Lake Spaulding, most of the water temperature measurements taken in 2008 and 2009 were well within the optimum temperature range of rainbow and brown trout and generally met Basin Plan criteria. Water temperatures in Lake Spaulding exceeded 20°C only in July 2009, and exceedances were limited to the top 10 feet of the reservoir, with a maximum water temperature of 21.5°C.

Reservoir temperature profiles near Lake Spaulding dam from July through September 2008 and July through October 2009 varied significantly. Both July 2008 and 2009 temperature profiles were characterized by a 15- to 20-foot upper epilimnion that rapidly decreased in temperature with depth, an approximately 50- to 125-foot lower epilimnion characterized by gradually decreasing temperatures with depth, an approximately 10- to 20-foot thermocline characterized by rapidly decreasing temperatures with depth, and a 25- to 45-foot hypolimnion. However, water temperatures in Lake Spaulding in September 2008 and September and October 2009 were characterized by a 90- to 140-foot epilimnion, a 5- to 10-foot thermocline characterized by sharply reduced temperatures, and a 30- to 70-foot hypolimnion. Minimum flow releases from Lake Spaulding dam to the South Yuba River are withdrawn from a low-level outlet near the bottom of the reservoir. The water temperature at the outlet elevation in 2008 and 2009 was about 7°C in July through October. Releases from Lake Spaulding are mostly diverted to South Yuba canal and Drum canal to supply flow for the Spaulding no. 1 and no. 2 powerhouses. The powerhouses both have upper and lower intake tunnels that are controlled by butterfly valves. Current operations use both the upper and lower intake butterfly valves in order to release water with mixed temperature to South Yuba and Drum canals.

To determine the effect of existing mixed operations on in-lake and downstream temperatures, in late August to early September 2009, PG&E conducted a variable operations analysis of in-lake and downstream temperatures during mixed usage while solely operating the upper or lower intakes.

Throughout the monitoring period, temperature profiles were collected near the powerhouse intakes and temperature measurements were taken downstream at the head of South Yuba and Drum canals. The variable operations analysis determined that mixed releases from the upper and lower intakes maintain a relatively stable temperature in South Yuba and Drum canals. Operating either the upper or lower intake valves independently, however, affects reservoir stratification and downstream canal temperatures. Using only the upper intake valve increased the depth and volume of the coldwater hypolimnion because water was not being withdrawn from the bottom of the reservoir, with the exception of a small volume through the low-level outlet to the South Yuba River. In contrast, using the lower intake valve decreased the depth and volume of the hypolimnion. Additionally, using the lower intake resulted in canal temperatures that were roughly 1°C cooler than what would have been expected under operation of both intakes. Using the upper intake resulted in canal temperatures that were 1°C warmer than would have been expected under operation of both intakes.

Lake Valley Reservoir (Drum-Spaulding Project, Drum No. 1 and No. 2 Development)—Water quality conditions in Lake Valley reservoir, including temperatures, support a coldwater fishery. Although project operations influence seasonal water quality conditions in Lake Valley reservoir, and water temperatures in the North Fork of the North Fork American River are affected by releases from Lake Valley reservoir, most of the water temperature measurements taken in 2008 and 2009 were well within the optimum temperature range of salmonids and generally met Basin Plan criteria. The surface water temperature in Lake Valley reservoir in June 2008 and 2009 was about 15°C, and bottom temperatures ranged from 8.4°C to 10.7°C. Water temperatures in August 2008 and 2009 were higher, ranging from 21.1°C to 21.5°C near the surface and 10.9°C to 12.8°C near the bottom.

The reservoir temperature profile in June 2008 was characterized by a weakly stratified water column with a near linear decrease in temperature from the surface to the bottom. In contrast, the June 2009 temperature profile was characterized by a 15-foot epilimnion, an equivalently deep thermocline characterized by sharply reduced temperatures with depth, and a 25-foot thermally stable hypolimnion. Reservoir temperature profiles in August 2008 and 2009 were characterized by a 25- to 30-foot epilimnion, a 10-foot thermocline, and a 5- to 15-foot, gradual, thermally decreasing hypolimnion.

Minimum flow releases from Lake Valley dam to the North Fork of the North Fork American River are withdrawn from a low-level outlet near the bottom of the reservoir. Water temperature at the outlet elevation in 2008 and 2009 ranged from 8.4°C in June to 12.8°C in August. About 30 percent of flow released from Lake Valley reservoir is diverted to Lake Valley canal.

Chicago Park Forebay (Yuba-Bear Project, Chicago Park Development)—Water quality conditions in Chicago Park forebay, including temperatures, support a coldwater trout-dominated fishery. Although project operations influence seasonal water quality conditions in Chicago Park forebay, and water temperatures in the Bear River are affected by releases from Chicago Park forebay, most of the water temperature measurements taken in 2008 and 2009 were well within the optimum temperature range of salmonids and generally met Basin Plan criteria. Water temperatures in Chicago Park forebay exceeded 20°C in October 2008, with a maximum water temperature of 20.7°C.

Chicago Park forebay exhibits weak and intermittent stratification because of the lack of storage and frequent fluctuations in reservoir levels. No temperature profiles were taken at this reservoir, and the temperature at the outlet elevation is unknown. Releases from Chicago Park forebay through the Chicago Park powerhouse are routed via the Bear River to Rollins reservoir.

Rollins Reservoir (Yuba-Bear Project, Rollins Development)—Water quality conditions in Rollins reservoir, including temperatures, support a coldwater fishery. Project operations influence seasonal water quality conditions in Rollins reservoir, and water temperatures in the downstream reach of Bear River are affected by releases from Rollins reservoir and the Bear River canal diversion dam. Water

temperatures in 2008 and 2009 increased from May through September. In 2008, surface water temperatures in Rollins reservoir ranged from 16.3°C in October to 23°C in August, and bottom temperatures ranged from 8.3°C in May, July, and August to 9.3°C in June. In 2009, surface water temperatures in Rollins reservoir ranged from 13.5°C in May to 24.8°C in July, and bottom temperatures ranged from 7.6°C in June to 17.6°C in October. These surface temperatures seasonally exceed the optimum temperature range of salmonids and the Basin Plan criteria.

The reservoir temperature profiles assessed in 2008 and 2009 exhibited stratification that became stronger from May through September. The May temperature profile was characterized by a weakly stratified water column, with a shallow (0- to 10-foot) epilimnion characterized by rapidly decreasing temperature with depth, no thermocline, and a deep (30- to 40-foot) hypolimnion characterized by gradually decreasing temperature with depth. From June through September, the water column became increasingly stratified with a deep (0- to 30-foot) epilimnion, a 5- to 10-foot thermocline characterized by a rapid decrease in temperature, a deep (100- to 120-foot) thermally stable hypolimnion, and a bottom characterized by sharply reduced temperatures with depth. In October, water column stratification was disrupted and characterized by a single thermally stable layer, which was most likely the result of fall turnover. Usable storage of the coldwater pool in Rollins reservoir ranged from 0 acre-feet in October to 1,500 acre-feet in July.

Minimum flow releases from Rollins dam to the Bear River are withdrawn from a low-level outlet near the bottom of the reservoir. Water temperature at the outlet elevation in 2008 and 2009 ranged from 7.6°C to 8.3°C in June. The majority of releases from Rollins reservoir are diverted to the Bear River canal.

Sediment Transport and Supply

The Basin Plan water quality criteria require that “increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: where natural turbidity is 0 to 5 NTU, increases shall not exceed 1 NTU; and where natural turbidity is between 5 to 50 NTUs, increases shall not exceed 20 percent.” In order to determine if turbidity increased in project-affected streams and reservoirs, PG&E and NID compared upstream, reservoir, and downstream turbidity values.

Comparing upstream to downstream turbidity values from the spring, summer, and fall sampling periods suggests that the stream reaches downstream of Rollins reservoir (Yuba-Bear Project) may not comply with the Basin Plan objectives during the spring and fall. In spring samples, turbidity upstream of Rollins reservoir (Yuba-Bear Project-affected reach) at all sites was less than or equal to 2.1 NTU. Greenhorn Creek, a tributary to Rollins reservoir, had a turbidity of 5.5 NTU.

During spring, Bear River downstream of Rollins reservoir, Dry Creek below Halsey afterbay dam (Drum-Spaulding Project’s Halsey development), and Mormon Ravine (Drum-Spaulding Project’s Newcastle development) had turbidities of 20, 27.2, and 23.6 NTU, respectively. The elevated turbidity in Mormon Ravine was observed upstream of the Newcastle powerhouse tailrace. Turbidity in all summer samples from these reaches was less than or equal to 2.6 NTU. Of the fall 2008 samples, turbidity values were generally higher, ranging from 4.6 to 22.3 NTU in these reaches.

3.3.2.1.3 Aquatic Biota

Streams and reservoirs in the Drum-Spaulding and Yuba-Bear Project areas support fisheries for rainbow trout, brown trout, and a transitional warmwater fish assemblage in the lower elevation portions of the project areas. Prior to the introduction of non-native fish species, the Sierra Nevada native fish populations in accessible lakes and streams of the Sacramento-San Joaquin drainage included 22 taxa, including 3 anadromous fish: Chinook salmon, steelhead, and Pacific lamprey (NID, 2008). The

abundance and distribution of native fish species in Sierra Nevada streams, rivers, and lakes has dramatically changed as a result of several factors, including the introduction of non-native species, construction of dams and diversions, alteration of aquatic habitat, and watershed disturbance (Moyle et al., 1997). In this section, we describe the aquatic habitats and aquatic biota within project-area waters. Table 3-91 lists the 34 fish species that are known to occur in the project areas or are likely to occur downstream of the projects.

Important and Special Status Fish Species

One special status fish species, hardhead (*Mylopharodon conocephalus*), is known to occur in the vicinity of the projects and is considered both a California Species of Concern and a Forest Service Sensitive Species. Hardhead is a large, native minnow that is generally found in undisturbed areas of larger low- to middle-elevation streams (between 30 and 4,760 feet msl in the Sacramento and San Joaquin watersheds). Its range extends from the Kern River in the south to the Pit River in the north. Hardhead inhabits areas that have clear, deep pools with sandy, gravel/boulder substrates, and slow water velocities (less than 0.05 feet per second). Hardhead co-occurs with Sacramento pikeminnow and usually with Sacramento suckers, and it tends to be absent from streams where introduced species, especially centrarchids, predominate. Hardhead could occur in lower elevation project-affected stream reaches of the Middle and South Yuba Rivers and the Lower Auburn Ravine; however, hardhead was not documented in any of the stream reaches or reservoirs in the project areas during recent fish surveys. Federally listed fish species are discussed in section 3.3.4, *Threatened and Endangered Species*.

Both rainbow trout and brown trout support recreational fisheries in the area of the two projects. Rainbow trout is native to most west-side Sierra Nevada watersheds below an elevation of 4,900 feet msl, but has been introduced to higher elevation waters including much of the project areas. Rainbow trout spawns in the spring, although the specific spawning period is influenced by factors such as the genetic strain of the fish, water temperature, and duration of daylight. Spawning usually occurs in gravel riffles or gravel pockets of small streams. Females excavate a nest, or “redd,” in the gravel and cover the eggs with gravel after spawning. After hatching, the fry remain in the gravel until their yolk sacs are absorbed. The fry then venture into open water, feeding on plankton and aquatic macroinvertebrates. As they mature, trout individuals begin to feed on aquatic and terrestrial insects; larger individuals also feed on fish and crayfish.

Brown trout occurs mainly in low- to mid-elevation ranges and can be found in tributaries, rivers, lakes, and reservoirs. Adults generally remain near the bottom of pools, while juveniles can be found in riffles and pools. Brown trout spawns in the fall, although the specific spawning time is influenced by factors such as the genetic strain of the fish, water temperature, and duration of daylight. Spawning usually occurs in gravel riffles or gravel pockets of small streams. Despite differences in timing, the spawning and rearing characteristics of brown trout are similar to rainbow trout.

Prior to construction of the Englebright dam for control of mining debris in 1941, the Yuba River supported anadromous populations of spring-run Chinook salmon, fall-run Chinook salmon, and steelhead. Currently operated by the U.S. Army Corps of Engineers, Englebright dam defines the upstream limit of salmon and steelhead migration, and none of these species is present in Drum-Spaulding and Yuba-Bear Project-affected reaches. On February 29, 2012, NMFS issued its Biological Opinion for the Corps’ operation and maintenance of both Englebright and Daguerre Point dams and Englebright reservoir on the Yuba River (NMFS, 2012). In the Biological Opinion, NMFS considers the YWCA’s Yuba River Development Project (FERC Project No. 2246), PG&E’s Drum-Spaulding Project, and NID’s Yuba-Bear Project to be interrelated and interdependent with operation and maintenance of Englebright and Daguerre Point dams, because operational decisions made by YCWA, PG&E, and NID affect flows and operational decisions at PG&E’s Narrows I powerhouse (FERC Project No. 1403) and

YCWA's Narrows II powerhouse (FERC Project No. 2246), and in the Lower Yuba River. In particular, the action area includes historic habitat that was accessible to federally listed populations of spring-run Chinook salmon and Central Valley steelhead prior to the construction of Englebright dam. This historic habitat includes the active stream channels and riparian corridors of the Yuba River starting at and including New Bullards Bar dam and reservoir, Log Cabin diversion dam, Our House diversion dam and pool (all part of FERC Project No. 2246), Spaulding dam and Lake Spaulding (Drum-Spaulding Project), and Milton reservoir and Bowman Lake (Yuba-Bear Project).

Reservoir Fish Populations

The Drum-Spaulding and Yuba-Bear Projects include 40 reservoirs of various sizes and elevations (section 2.1.1, *Existing Project Facilities*). Twenty-four of the project reservoirs are small diversion impoundments (<1,000 acre-feet), and 28 of the project reservoirs are located at elevations greater than 5,000 feet msl. Most of the reservoirs freeze over during winter months. The existing fish populations in project reservoirs and impoundments are the result of recruitment from connected stream and reservoir populations, stocking efforts by California Fish and Wildlife, and self-sustaining populations (NID, 2008). In addition, a wide variety of exotic game, non-game, and forage fish have been introduced into several of the project reservoirs as a result of authorized fishery planting programs, unauthorized intentional plantings, or inadvertent bait bucket releases (Moyle et al., 1997). Historical reports and recent fish surveys indicate 27 species of fish have occurred or occur in project reservoirs (tables 3-92 and 3-93); however, only 9 of these species are native to California.

Most of the larger reservoirs within the Drum-Spaulding and Yuba-Bear Projects are managed by California Fish and Wildlife as put-and-grow and catchable fisheries for rainbow and brown trout, with the exception of Milton Diversion impoundment, which is managed as a self-sustaining fishery for rainbow trout. California Fish and Wildlife classifies most of the other smaller reservoirs at the projects as unmanaged fisheries. Stocking records from California Fish and Wildlife indicate that 16 project reservoirs were planted with fish between 2002 and 2009 (table 3-94). During this period, California Fish and Wildlife stocked various combinations of five salmonid species and one subspecies in project reservoirs: rainbow trout, brown trout, brook trout, Eagle Lake rainbow trout, kokanee, and Chinook salmon (PG&E, 2011a and NID, 2011a).

To document fish populations in project reservoirs, PG&E and NID conducted fish sampling in 2009 at multiple sites in the five largest reservoirs at the Yuba-Bear Project (Jackson Meadows reservoir, Bowman Lake, and Rollins reservoir) and the Drum-Spaulding Project (Fordyce Lake and Lake Spaulding). Other project reservoirs were not sampled in 2009, because they represent a collection of relatively small, moderate to high elevation lakes dominated primarily by salmonids. Tables 3-92 and 3-93 present results from historical reports and reservoir surveys conducted in 2009. In the five project reservoirs sampled in 2009, PG&E and NID performed fish surveys using electrofishing and gillnetting surveys at all reservoirs except Fordyce Lake, where hydroacoustic and gillnetting surveys were performed. The number and species composition of fish collected during 2009 in each sampled project reservoir are provided in table 3-95.

The dominant fish species collected during the 2009 surveys varied between reservoirs. The forage fish species, Lahontan redbreast, was numerically dominant in fish collections from both Jackson Meadows reservoir and Bowman Lake, comprising about 84 and 62 percent of the total fish abundance, respectively. Fish collections in Rollins reservoir, the lowest elevation reservoir sampled in 2009, were dominated by smallmouth bass. In Lake Spaulding, Sacramento pikeminnow was numerically dominant and represented about 59 percent of the total fish collected. Rainbow trout, brown trout, and tui chub were the dominant fish species collected at Fordyce Lake, the highest elevation reservoir sampled in 2009.

The composition and abundance of salmonids also varied among the reservoirs sampled in the Drum-Spaulding and Yuba-Bear Projects. Both rainbow trout and brown trout were captured in each of the project reservoirs sampled in 2009. Although rainbow trout dominated fish collections in Fordyce Lake, three other trout species were collected in lower abundance: Lahontan cutthroat; brown trout; and brook trout. Combined, these four salmonid species represented about 74 percent of the total fish collected in 2009 in Fordyce Lake. The same four salmonid species were also collected in Jackson Meadows reservoir, but only represented about 11 percent of the total fish abundance. Three salmonid species were collected in Bowman Lake (rainbow trout, kokanee, and brown trout), representing about 29 percent of the total fish collected; however, brown trout was the dominant salmonid species, comprising about 22 percent of the total fish collected. Four species of salmonids, rainbow trout, Chinook salmon, brown trout, and brook trout, were collected in Lake Spaulding in 2009, comprising about 15 percent of the total fish collected. In Rollins reservoir, salmonids collected in 2009 were represented by rainbow trout and brown trout and comprised only about 9 percent of the total fish abundance.

Other fish collected in each of the reservoirs in 2009 were primarily forage species. In Fordyce Lake, the forage fish species, tui chub, was the only non-salmonid species collected. In Jackson Meadows reservoir, forage fish species represented by tui chub, speckled dace, and Lahontan redbreast comprised about 89 percent of the total fish collected and indicated an abundant forage base in the reservoir. With the exception of Lahontan redbreast, other fish collected in lower abundance in Bowman Lake included speckled dace. In Rollins reservoir, the fish community was primarily comprised of warmwater fish species, including bluegill, green sunfish, redear sunfish, black crappie, largemouth bass, channel catfish, white catfish, and brown bullhead. Forage species collected in lower abundance in Rollins reservoir included pond smelt, golden shiner, Sacramento pikeminnow, and Sacramento sucker. In Lake Spaulding, forage species collected included pond smelt, Sacramento pikeminnow, Lahontan redbreast, and Sacramento sucker. Smallmouth bass was also collected in low abundance in Lake Spaulding.

Stream Fish Populations

The Drum-Spaulding Project has the potential to affect stream fish populations located in the South Yuba River, Bear River, North Fork of the North Fork American River, and Sacramento River drainage basins. The Yuba-Bear Project has the potential to affect stream fish populations located in the Middle Yuba River, South Yuba River, and Bear River Basins. The South Yuba River and Middle Yuba River sub-basins drain into the Yuba River, a tributary of the Feather River. The Bear River sub-basin drains to the Feather River, downstream of the Yuba River confluence. The North Fork of the North Fork American River sub-basin drains into the American River, a tributary of the Sacramento River. Data from historical and recent fish studies indicate 32 species of fish have occurred or occur in project streams (table 3-96). In 2008 and 2009, PG&E and NID conducted fish surveys (electrofishing and snorkel observations) in 51 project-affected stream reaches within these drainage basins (PG&E and NID, 2010d). PG&E and NID collected or observed 15 species of fish during these surveys. The overall species composition from the relicensing surveys was dominated by rainbow trout and brown trout.

Middle Yuba River Sub-Basin (Yuba-Bear Project)

The project-affected reaches of the Middle Yuba River sub-basin consist of the Middle Yuba River, extending from the outlet at Jackson Meadow reservoir downstream to YCWA's impoundment at Our House dam (non-project, FERC Project No. 2246), and Wilson Creek, a tributary to the Middle Yuba River. Yuba-Bear Project facilities in the Middle Yuba River sub-basin include Jackson Meadows reservoir and dam, Milton diversion impoundment and dam, and Milton Bowman tunnel inlet on the Middle Yuba River, and Wilson Creek diversion dam on Wilson Creek; all of these waters are associated

with the Yuba-Bear Project Bowman Development. Fish species historically known to be present in the Middle Yuba River sub-basin include rainbow trout, brook trout, brown trout, cutthroat trout, Lahontan cutthroat trout, Sacramento sucker, Sacramento pikeminnow, hardhead, and smallmouth bass. In 2008 and 2009, PG&E and NID collected a total of five fish species from the Middle Yuba River: rainbow trout, brown trout, Sacramento sucker, Sacramento pikeminnow, and Lahontan redbase. Lahontan redbase had not been previously documented in the sub-basin; however, it was abundant during 2009 fish surveys in Jackson Meadows reservoir. Overall, the species composition and relative fish abundance was dominated by rainbow trout and brown trout. The estimated density of rainbow trout collected from sample locations in the Middle Yuba River sub-basin ranged from 39 to 243 fish per 100 meters (328 feet). No fish were collected from Wilson Creek, because the creek is ephemeral and was dry at the time of sampling. Rainbow trout, brown trout, and Lahontan redbase were collected in the upper portion of the Middle Yuba River sub-basin, and rainbow trout, Sacramento sucker, and Sacramento pikeminnow were collected in the lower portion of the sub-basin.

Deer Creek Sub-Basin (Drum-Spaulding Project)

The project-affected reach of the Deer Creek Development consists of 0.1 mile on South Fork Deer Creek extending from the Deer Creek powerhouse tailrace (Drum-Spaulding Project) downstream to the Cascade diversion dam (non-project). The only project facility in the Deer Creek sub-basin is the Deer Creek powerhouse. Historical information on fish populations is limited for the Deer Creek sub-basin. Past surveys and observations indicate that rainbow trout, brown trout, and Sacramento sucker may occur in this reach; however, PG&E and NID did not collect or observe any fish species in the 2008 and 2009 surveys.

Canyon Creek and Texas Creek Sub-Basins (Yuba-Bear and Drum-Spaulding Projects)

The project-affected stream reaches in the Canyon Creek sub-basin consist of Canyon Creek, from French dam downstream to the confluence with the South Yuba River, and tributaries of Canyon Creek, including Jackson Creek, Texas Creek, Lindsey Creek, and an unnamed stream reach below Culbertson Lake. Project facilities in the Canyon Creek sub-basin include Upper Rock Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Lower Rock Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Upper Lindsey Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Middle Lindsey Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Lower Lindsey Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Culbertson Lake reservoir and dam (Drum-Spaulding Project, Spaulding No. 3 Development), Jackson Lake reservoir and dam (Yuba-Bear Project, Bowman Development), Bowman Lake reservoir and dam (Yuba-Bear Project, Bowman Development), French Lake reservoir and dam (Yuba-Bear Project, Bowman Development), Faucherie Lake reservoir and dam (Yuba-Bear Project, Bowman Development), Sawmill Lake reservoir and dam (Yuba-Bear Project, Bowman Development), Bowman powerhouse (Yuba-Bear Project, Bowman Development), and Bowman-Spaulding conduit (Yuba-Bear Project, Bowman Development). Historical information on the fish community inhabiting project-affected reaches in the Canyon Creek sub-basin is limited; however, based on an analysis of fish populations in local impoundments, the watershed could support rainbow trout, brook trout, brown trout, Lahontan redbase, and brown bullhead. Fifteen project-affected reaches of the Canyon Creek sub-basin were sampled for fish in 2008 and 2009. Three fish species were collected during these studies: rainbow trout, brook trout, and brown trout. Brown trout was collected at most sample sites; however, rainbow trout was collected in the highest relative abundance. Brook trout was only collected at one sample site during one of the two sample years (2008). The estimated total density of rainbow trout and brown trout combined from sample sites in the Canyon Creek sub-basin ranged from 127 to 194 fish per 100 meters (328 feet).

Fall Creek Sub-Basin (Drum-Spaulling Project)

The project-affected stream reaches in the Fall Creek sub-basin, within the South Yuba River Basin, consist of Fall Creek from the confluence with the South Yuba River upstream to its headwaters and its tributaries. Project facilities in the Fall Creek sub-basin consist of Feeley Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 3 Development) and Carr Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 3 Development). The 2008 and 2009 fish surveys were conducted in Fall Creek, within Carr Lake dam reach no. 2; in Fall Creek diversion dam reach (RM 1.9); in Clear Creek diversion gate reach; in Lake Creek, within Feeley Lake dam reach; in Carr Lake dam reach no. 1; in Fall Creek, within Carr Lake dam reach no. 2 and Fall Creek diversion dam reach; and in Trap Creek, within Trap Creek diversion gate reach. At all sites surveyed in the Fall Creek sub-basin, rainbow and brown trout were the only fish species collected. Rainbow trout dominated fish collections at all sampled reaches. No fish were collected in Feeley Lake dam reach, and Trap Creek diversion gate reach was dry at the time of sampling. Combined rainbow trout and brown trout densities at quantitative sample sites ranged from 26 to 147 fish per 100 meters (328 feet).

Rucker Creek Sub-Basin (Yuba-Bear and Drum-Spaulling Projects)

The project-affected stream reach in the Rucker Creek sub-basin, within the South Yuba River Basin, consists of Rucker Creek from the confluence with the South Yuba River upstream to its headwaters. Project facilities in this sub-basin include Blue Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 3 Development) and Rucker Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 3 Development) on Rucker Creek above the Bowman-Spaulling conduit (Yuba-Bear Project, Bowman Development) and Rucker Creek below Rucker Creek diversion gate (Yuba-Bear Project, Bowman Development).

Historic information on fish populations inhabiting Rucker Creek indicated the presence of rainbow trout, largemouth bass, smallmouth bass, and green sunfish. PG&E and NID collected three fish species from Rucker Lake dam reach in 2008 and 2009: rainbow trout, brown trout, and green sunfish. No fish were collected from Blue Lake dam reach or Rucker Creek diversion gate reach. Brown trout was the only fish species collected in both years of sampling, although rainbow trout was the dominant species. In 2009, the combined density for rainbow trout and brown trout was relatively low at 22 fish per 100 meters (328 feet). Individuals representing multiple age classes of both trout species were collected, indicating regular recruitment in the Rucker Creek sub-basin.

South Yuba River Sub-Basin (Yuba-Bear and Drum-Spaulling Projects)

Three large sub-watersheds comprise the South Yuba River sub-basin: Fordyce Creek, the South Yuba River above Lake Spaulling, and the South Yuba River below Lake Spaulling. The project-affected stream reaches in the South Yuba River sub-basin consist of the mainstem of the South Yuba River above Englebright reservoir to its headwaters above Lake Spaulling. Project facilities in this sub-basin include Meadow Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), White Rock Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), Kidd Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), Upper Peak Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), Fordyce Lake reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), Lake Spaulling reservoir and dam (Drum-Spaulling Project, Spaulling No. 1 and No. 2 Development), the downstream portion of the Bowman-Spaulling conduit (Yuba-Bear Project, Bowman Development), and Spaulling no. 1, no. 2, and no. 3 powerhouses (Drum-Spaulling Project, Spaulling No. 1 and No. 2 and No. 3 Developments). Additionally, the South Yuba River downstream of Lake Spaulling is also affected by diversion of water from tributaries of the South Yuba River, regulation of flows in Canyon Creek, and water deliveries through Lake Spaulling.

Historical data on fish populations in the South Yuba River sub-basin documented the presence of rainbow trout, brook trout, brown trout, and Sacramento sucker in the Fordyce Creek watershed. Other species, including cutthroat trout, Lahontan redbreast, and brown bullhead, have been documented in reservoirs within the sub-basin. Additionally, hardhead has been historically documented as occurring in the South Yuba River sub-basin below Lake Spaulding. In 2008 and 2009, as part of relicensing studies, fish surveys were conducted at 18 sites in the South Yuba River sub-basin. During these surveys, PG&E and NID collected or observed a total of 11 fish species including rainbow trout, brook trout, brown trout, Sacramento sucker, Sacramento pikeminnow, California roach, Lahontan redbreast, speckled dace, brown bullhead, smallmouth bass, and green sunfish. Generally, the fish communities in the upper reaches of the South Yuba River were only comprised of trout, and lower reaches of the sub-basin were dominated by warmwater fish species. At quantitative sample sites, the estimated density of rainbow trout ranged from 23 to 86 fish per 100 meters (328 feet) at electrofishing sites and from 0 to 262 fish per 100 meters (328 feet) at snorkeling sites. Estimated brown trout densities ranged from 0 to 345 fish per 100 meters (328 feet) at electrofishing sites and 0 to 549 fish per 100 meters (328 feet) at snorkeling sites.

Bear River Sub-Basin (Yuba-Bear and Drum-Spaulding Projects)

The project-affected reaches within the Bear River sub-basin consist of the Bear River and its tributaries from Lake Combie (non-project water supply reservoir) upstream to the headwaters near Lake Spaulding. Project facilities in the sub-basin include Drum forebay (Drum-Spaulding Project, Drum No. 1 and No. 2 Development), Drum afterbay (Drum-Spaulding Project, Dutch Flat No. 1 Development), Dutch Flat forebay (Yuba-Bear Project, Dutch Flat No. 2 Development), Dutch Flat afterbay (Yuba-Bear Project, Chicago Park Development), Rollins reservoir and dam (Yuba-Bear Project, Rollins Development), Rollins powerhouse (Yuba-Bear Project, Rollins Development), Drum no. 1 and no. 2 powerhouses (Drum-Spaulding Project, Drum No. 1 and No. 2 Development), Dutch Flat no. 1 powerhouse (Drum-Spaulding Project, Dutch Flat No. 1 Development), Dutch Flat no. 2 powerhouse (Yuba-Bear Project, Dutch Flat No. 2 Development), Chicago Park powerhouse (Yuba-Bear Project, Chicago Park Development), Bear River canal diversion dam (Drum-Spaulding Project, Halsey Development), and Bear River canal (Drum-Spaulding Project, Halsey Development).

Historical fish surveys documented only rainbow trout and brown trout in streams of the Bear River sub-basin; however, brook trout, Sacramento pikeminnow, golden shiner, largemouth bass, smallmouth bass, and green sunfish have been documented more recently in Bear River sub-basin reservoirs. As part of the relicensing studies, fish surveys were conducted at 13 sites within the Bear River sub-basin. PG&E and NID collected or observed a total of seven fish species that included rainbow trout, brown trout, Sacramento sucker, Sacramento pikeminnow, speckled dace, smallmouth bass, and green sunfish. Generally, rainbow trout and brown trout were dominant at upper sites in the sub-basin, whereas warmwater fish species were dominant at sites in the lower reaches of the sub-basin.

North Fork American River Sub-Basin (Drum-Spaulding Project)

Project-affected reaches in the North Fork American River sub-basin consist of the North Fork of the North Fork American River and its tributaries and Canyon Creek. Project facilities in the North Fork American River sub-basin include Lake Valley reservoir and dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development), Kelly Lake reservoir and dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development), Towle diversion (Drum-Spaulding Project, Alta Development), and Towle canal diversion dam (Drum-Spaulding Project, Alta Development).

Historically, the only fish species documented in the project-affected stream reaches of the North Fork American River sub-basin included rainbow trout, brown trout, and green sunfish. Relicensing studies in 2008 and 2009 documented five species of fish that included rainbow trout, brown trout, Sacramento sucker, California roach, and green sunfish. Additionally, two fish species, golden shiner and

brown bullhead, were collected during entrainment monitoring in the Lake Valley canal diversion dam reach in 2009. Overall, rainbow trout and brown trout dominated the fish collections. At quantitative sample sites, the estimated density of rainbow trout and brown trout ranged from 67 to 127 fish per 100 meters (328 feet).

Mormon Ravine Sub-Basin (Drum-Spaulling Project)

The Mormon Ravine sub-basin is located within the American River Basin and includes Mormon Ravine from Folsom Lake (non-project managed by Reclamation) up to the headwaters near the town of Newcastle. No project facilities exist in Mormon Ravine; however, the Newcastle powerhouse header box (Drum-Spaulling Project, Newcastle Development) delivers a minimum instream flow, as well as periodic spills, from the South canal (Drum-Spaulling Project, Newcastle Development) into Mormon Ravine. The project-affected reach consists of about 0.3 mile of Mormon Ravine from Folsom Lake to the spill channel from the Newcastle powerhouse header box.

No historical fish information was available for the Mormon Ravine sub-basin; however, fish surveys in 2008 collected two species, rainbow trout and riffle sculpin (*Cottus gulosus*). Rainbow trout dominated collections, representing 79 percent of the total abundance.

Coon Creek Sub-Basin (Drum-Spaulling Project)

The project-affected reaches within the Coon Creek sub-basin are the tributaries Dry Creek and Rock Creek. Project facilities in these tributaries include Halsey afterbay (Drum-Spaulling Project, Wise and Wise No. 2 Development), Halsey powerhouse (Drum-Spaulling Project, Halsey Development), and Rock Creek reservoir and dam (Drum-Spaulling Project, Wise and Wise No. 2 Development).

No historical data on fish populations were available for Dry Creek and Rock Creek. In 2008 and 2009, fish surveys in the project-affected tributaries documented rainbow trout, brown trout, golden shiner, mosquitofish, green sunfish, pumpkinseed, and bluegill. Overall, rainbow trout or brown trout dominated fish collections in each of the two tributaries.

Auburn Ravine Sub-Basin (Drum-Spaulling Project)

The project-affected reach within the Auburn Ravine sub-basin is situated within the Sacramento River Basin and consists of Auburn Ravine and its tributaries upstream of the East Side canal (non-project water delivery). Project facilities in the Auburn Ravine sub-basin include Wise powerhouse (Drum-Spaulling Project, Wise and Wise No. 2 Development), Wise no. 2 powerhouse (Drum-Spaulling Project, Wise and Wise No. 2 Development), and South canal (Drum-Spaulling Project, Newcastle Development).

During fish surveys conducted primarily in the Lower Auburn Ravine in 2004, PG&E and NID identified brown trout, steelhead, Chinook salmon, Sacramento sucker, Sacramento pikeminnow, California roach, golden shiner, speckled dace, hardhead, mosquitofish, hitch (species not specified), largemouth bass, green sunfish, pumpkinseed, bluegill, red shiner, redear sunfish, spotted bass, bigscale logperch, common carp, and black bullhead; the bass, logperch, and bullhead were collected upstream of the project-affected reach. In addition, an unidentified sculpin and lamprey were also collected. During the fish surveys in 2008, PG&E and NID collected rainbow trout, speckled dace, and riffle sculpin.

Aquatic Macroinvertebrates

In order to characterize aquatic macroinvertebrate communities in project-affected reaches of the Drum-Spaulling and Yuba-Bear Projects, the applicants conducted surveys in the vicinity of the projects

during 2009. Within the Middle Yuba River, Canyon Creek, South Yuba River, Bear River, North Fork of the North Fork American River, Coon Creek, Auburn Ravine, Fordyce Creek, and North Yuba River sub-basins, 26 stream reaches were sampled following protocols adopted from the Surface Water Ambient Monitoring Plan. The sampled stream reaches included two reference reaches in the North Yuba River not affected by the project. PG&E and NID (2010e) collected 12,111 organisms, representing 224 distinct taxa. In general, the most common taxa collected included midges (Chironomidae), blackflies (Simuliidae), and mayflies (*Baetis tricaudatus*).

Using benthic community structure metrics, two indices, the multi-metric index (MMI) and the index of biotic integrity (IBI), were calculated for samples from each stream reach. Both indices were used to assess biological conditions affected by hydropower operations. Generally, MMI and IBI scores were higher at higher elevation sites (montane ecozone) than scores at lower elevation sites (foothill ecozone). The highest MMI and IBI scores occurred at the Middle Yuba River, Milton diversion dam reach-middle (Yuba-Bear Project, Bowman Development) and the lowest scores occurred at South Yuba River reach no. 1 (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) (table 3-97). Four sample reaches were categorized as having “poor” biological conditions for at least one of the indices, and eight sample reaches were categorized as having “good” biological conditions for at least one of the indices. All other sampled reaches were categorized as having “fair” biological conditions for both indices. The MMI scores did not indicate a consistent trend in scores with distance downstream from reservoirs or diversion dams.

Aquatic Mollusks

During the applicants’ consultation with the Forest Service, seven species of special status aquatic mollusks were identified as potentially occurring in project-affected stream reaches of the Drum-Spaulding Project and Yuba-Bear Projects. One species, the Great Basin rams-horn, is known to occur in Trinity National Forest but has not been documented in project-affected reaches. Another species, California floater, although once widespread throughout California, is now believed to be extirpated from the Sacramento River Basin downstream of Shasta dam.

In 2008 and 2009, the applicants conducted surveys for special status mollusks in seven project-affected stream reaches located on NFS land. Surveys were conducted on the Middle Yuba River, Canyon Creek, North Fork of the North Fork American River, Fordyce Creek, and South Yuba River. No special status mollusks were collected during any of the surveys. The 2008 survey documented one gastropod species, *Juga (oreobasis)*, in the Middle Yuba River. The 2009 survey documented only two relic shells in the South Yuba River, one belonging to the gastropod *Juga* and one belonging to a bivalve from the Sphaeriidae family.

3.3.2.2 Environmental Effects

3.3.2.2.1 Water Year Type

PG&E and NID propose monthly minimum streamflow regimes that are dependent on water year type. Six water year types (extreme critically dry, critically dry, dry, below normal, above normal, wet) were identified (table 3-98⁸) as a result of a distribution analysis of annual runoff (acre-feet) for the period of record. Determination of water year type for a given month would be based on California DWR water year forecast of unimpaired runoff (acre-feet) in the Yuba River at Smartville as reported in California DWR Bulletin 120, *Water Year Conditions in California*. California DWR’s forecast, which is published

⁸ The tables referenced in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, are provided in appendix A-2.

in February, March, and April, would apply from the 15th day of the publication month to the 14th day of the next month. From May 15 through October 14, the water year type would be based on California DWR's forecast published in May. From October 15 through February 14 of the following year, the water year type would be based on the sum of California DWR's monthly full natural flow for the full water year ending September 30 for the Yuba River.

For certain stream reaches, Forest Service condition 29 for the Drum-Spaulding Project and BLM condition 3 for the Yuba-Bear Project specify and Forest Service recommendation 1 for the Yuba-Bear Project recommends that extreme critically dry water year type flows be implemented in the second year of two sequential critically dry years. The Drum-Spaulding Project stream reaches to which this measure would apply include: (1) South Yuba River below Lake Spaulding dam (Spaulding No. 1 and No. 2 Development); (2) North Fork of the North Fork American River below Lake Valley reservoir dam (Drum No. 1 and No. 2 Development); and (3) North Fork of the North Fork American River below Lake Valley canal diversion dam (Drum No. 1 and No. 2 Development). The Bear River below Rollins dam is the only Yuba-Bear Project-affected reach to which this condition would apply. PG&E and NID agreed to the modification for back to back critically dry water years when they filed alternatives to the Forest Service and BLM conditions.

Depending on time of year Reclamation recommended (recommendation 1.a) the use of two different indexes for determination of water year type (table 3-99) for minimum streamflow releases to Mormon Ravine upstream of Folsom Lake. Determination of water year type for January would use the Sacramento River Unimpaired Flow Index at the 75 percent exceedance forecast. For February through May the Yuba River Unimpaired Forecast at the 90 percent exceedance from DWR Bulletin 120 would be used.

Our Analysis

Inter-annual variability in precipitation and runoff is an important natural condition to which aquatic communities are adapted and which can affect community resilience and diversity. This measure establishes six water year types that would trigger various conditions (e.g., minimum flow releases) in the new licenses for the Drum-Spaulding and Yuba-Bear Projects. PG&E and NID propose a categorization of water year types based on the historical distribution of annual runoff. PG&E and NID propose that minimum streamflows for selected stream reaches (section 3.3.2.2.2) would vary depending on predicted monthly trends in estimated natural, unregulated runoff in the Yuba River Basin.

Forest Service, BLM, and California Fish and Wildlife agree with the method proposed by the licensees for determining water year from the WDR Bulletin 120 forecast for Yuba River at Smartville. The two indexes recommended by Reclamation for determining water year are not consistent with the 4(e) conditions from Forest Service and BLM; although the source of all water discharged from the Newcastle Development to Mormon Ravine is the Yuba and Bear River watersheds on which the DWR Bulletin Yuba River Index is based. For consistency with all other project-affected stream reaches and to other stakeholder's 4(e) conditions, method for water year determination based on DWR Bulletin 120 unimpaired forecast for Yuba River and Smartville, proposed by PG&E, NID and the other licensing stakeholders is most appropriate for use at all project-affected reaches.

During extended drought conditions represented by back to back critically dry water years the hydrologic system is likely to be highly stressed with reduced water tables and snowpack and minimal residual storage available in lakes and reservoirs. In addition, subsequent recovery of the ecosystem from multiple drought years can be an extended process. Implementation of the modification to treat the second of two sequential critically dry years as an extreme critically dry year would reduce the potential effects of meeting minimum streamflows at four major project diversions on water delivery requirements in the region.

This proposal would help mimic some of the natural variability in flow observed among years in the historical data for many project-affected stream reaches. This measure could enhance aquatic resources, as well as conserve water resources for water delivery and power generation during particularly dry years.

3.3.2.2.2 Instream Flows

Altered hydrologic conditions (timing and magnitude) associated with hydroelectric project facilities and operations (e.g., diversion, pulse flows, and ramping rates) can affect aquatic and riparian habitat of reservoirs and downstream stream reaches. Reduced flow, less seasonal variation, and more rapid fluctuations in flow that result from operation of project reservoirs and diversions can affect aquatic biota and habitat, as well as other users (e.g., recreational visitors addressed in section 3.3.5, *Recreation Resources*, and section 3.3.7, *Land Use and Aesthetic Resources*; native American culture addressed in section 3.3.6, *Cultural Resources*; and power generation, addressed in section 4, *Developmental Analysis*). Optimal flow conditions, however, can differ significantly among these various resources and users, requiring a balanced evaluation of the effects of proposed project operations to each user. Generally, the project facilities and operations capture and store snowmelt runoff in project reservoirs during spring and early summer for distribution and delivery to agricultural, municipal, domestic, and commercial users throughout the year. The two projects divert water in the Middle Yuba River, Canyon Creek, South Yuba River, Bear River, and North Fork of the North Fork American River Basins.

The proposed flow regimes for each stream reach were collaboratively developed by PG&E, NID, and relicensing stakeholders using several modeling approaches to evaluate the relationship between flow and physical habitat, in order to optimize habitat for selected resident species, primarily various life stages and habitat uses of rainbow trout, the most widely distributed and abundant fish species throughout the project-affected stream reaches. The habitat-flow relationship was also evaluated for foothill yellow-legged frog in stream reaches where this species has been found.

PG&E, NID, and the relicensing stakeholders developed an extensive, detailed rationale for minimum streamflow schedules to benefit aquatic resources for each project-affected reach. The minimum streamflows were developed with the objective of balancing ecological resource needs, recreational opportunities, water supply demands, and hydroelectric generation, to the extent possible. Ecologically related considerations included, among other things, estimated unregulated flows, historical regulated flows under the existing license and proposed action, upstream reservoir storage capacities, water temperature data, WUA for adult and spawning life stages of resident rainbow trout, habitat for foothill yellow-legged frog in applicable stream reaches, and general enhancement of stream habitat. Historical streamflows under the existing license and estimated unregulated streamflow information is summarized in section 3.3.2.1.1, *Affected Environment, Water Quantity*.

During relicensing studies, PG&E and NID conducted instream flow studies (technical memorandum 3-2, Instream Flow) to determine how streamflow affects habitat for aquatic organisms in selected project-affected stream reaches. These studies generated estimates of various indexes (e.g., weighted usable area [WUA] and wetted perimeter breakpoint) of available aquatic habitat as a function of flow or stage. Determining an optimum flow regime frequently requires balancing the seasonal requirements of various species and life stages, because flow conditions that create optimal habitat are often not consistent among species and life stages. The results of these studies were used by PG&E, NID, and the relicensing stakeholder to inform decisions related to minimum streamflows. In general, the goal of these discussions was to agree on a minimum flow schedule that would accommodate a balance of optimal habitat conditions for various target species and life stages, as well as other resources and users while still assuring the economic viability of the projects and the capacity to satisfy water delivery commitments.

The PHABSIM is a relatively sophisticated model that uses water velocity and depth, substrate and cover and other potential factors to evaluate the relationship between flows and quality of available aquatic habitat (WUA). Where WUA indexes were estimated, the goal of PG&E, NID, and the relicensing stakeholders was to develop a flow schedule that would generally provide about 80 percent of the maximum WUA under ideal flows for each species over time, particularly during critical life stages (e.g., spawning, fry emergence). Variable meteorological conditions affect available water in a stream reach under both regulated and unregulated flow conditions: (1) during extreme critically dry and critically dry years, some smaller project-affected stream reaches could be dry for a portion of the year; and (2) during wet years, unusually high flows may exist. The natural, inter-annual variability in flow and associated habitat conditions influences the diversity, dynamics, and resilience of aquatic communities. Consequently, the goal of 80 percent of maximum WUA was used flexibly, with stakeholders accepting lower percentages during extreme critically dry and critically dry years in some stream reaches while expecting higher percentages during above normal and wet years.

Because WUA is a static relationship between habitat suitability and flow magnitude, it does not represent flow-habitat relations over time; that is, how frequently do specific habitat conditions exist. To evaluate the effects of alternative flow regimes on habitat over time, a time series of instream hydrologic data is integrated with WUA to generate a “habitat time series.” Habitat Exceedance Analysis (HEA) was developed as part of the relicensing Instream Flow Study to assess the flow-habitat relationships over time. The HEA uses mean daily instream hydrology coupled with the WUA-flow relationship to calculate the frequency of WUA conditions for target species and life stages over the hydrologic period of record (water years 1976-2008) used for relicensing studies. For each of the project-affected stream sub-reaches for which PHABSIM modeling was used to estimate WUA, HEA was calculated at two or more hydrologic nodes. At each hydrologic mid-point node for each modeled stream sub-reach, the HEA takes into account “reach-averaged” accretion of water through the stream sub-reach. At each node and for each day in the period of record, regardless of water year type, available habitat was calculated, expressed as a percentage of the maximum static WUA, as depicted on the static WUA-flow curves. This was done for every day in the period of record and resulted in a series of percentages relative to maximum WUA (i.e., one percentage value for each day in the period of record). Monthly exceedance curves were plotted from these data. HEA analysis is used to compare the duration that habitat would be available, as a percentage of maximum WUA, under the no-action (existing license), proposed action, or other alternative minimum streamflows.

The PHABSIM model is not an appropriate analytical tool for many of the small, low-flow, higher elevation headwater stream reaches affected by the project. For these stream reaches other methods including channel flow response (CFR) and demonstration flow analysis (DFA) were used to develop indexes of aquatic habitat that could inform the negotiation process. Physical measurements of transect characteristics were made under multiple flow conditions and used to interpolate and extrapolate estimates of wetted perimeter, wetted width, and average depth as indexes of available habitat. Percent change in wetted perimeter with increasing flow was evaluated to identify breakpoints in the curve as a target range for selecting minimum summer flows for the stream reach.

PG&E, NID, and the relicensing stakeholders considered available information on species compositions and length frequency in the study stream reaches, and seasonal use and distribution of species/life stages in each stream reach. The typical evaluation steps included: (1) plotting seasonal occurrence/utilization of the stream reach by rainbow trout and foothill yellow-legged frog, where appropriate, against estimated unregulated flows and existing license conditions; (2) examining length frequency and age structure of resident rainbow trout; (3) modeling WUA habitat response to flow; (4) determining maximum WUA and preliminary minimum streamflows that would ensure availability of at least 80 percent of maximum WUA; and (5) using the operations model to assess the effects of the 80 percent WUA flows on power generation and water delivery and then adjusting the preliminary minimum

flow schedule by month and water year type to provide a range of minimum flow/WUA that PG&E, NID, and the relicensing stakeholders agreed would balance the needs of aquatic resources, water delivery, and power generation.

Drum-Spaulding Project

Flow in a stream reach affects the quality and quantity of habitat available to aquatic organisms through its effect on a range of aquatic habitat features including, but not limited to, water depth, inundation, wetted perimeter, cover, and velocity. Where streamflow is diverted for power generation, water supply, or other uses, the quantity of water and natural seasonal and inter-annual variability are typically reduced. To improve habitat conditions for resident aquatic organisms, PG&E proposes minimum streamflows (DS-AQR1, Part 1, *Water Year Type*; Part 2, *Minimum Streamflows*) for 14 stream reaches affected by the Drum-Spaulding Project, which are generally consistent with minimum streamflows specified in Forest Service condition 29 and California Fish and Wildlife recommendation 2.2 for the respective stream reaches. Compliance at these 14 stream reaches would be demonstrated through continuous monitoring. PG&E and the relicensing stakeholders proposed and recommended minimum streamflows for 16 additional projected-affected reaches controlled by remotely located dam headworks. Compliance in these remote stream reaches would be met by periodically resetting the low-level outlet at each of these dams. PG&E and the relicensing stakeholders anticipate that the proposed minimum streamflows would preserve or enhance aquatic habitat for resident rainbow trout and foothill yellow-legged frog compared to conditions with minimum streamflows (where they have been specified) under the existing license (table 3-100). Compared to estimated unregulated flow conditions, the proposed flows would frequently provide more habitat for a greater percentage of the time during summer and fall, when unregulated flows in many high elevation headwater stream reaches would otherwise be less than proposed flows; proposed flows would provide similar or less habitat than unregulated conditions during winter and spring, when natural unregulated runoff would be higher than the proposed flows.

The proposed minimum streamflows and estimated aquatic habitat changes for stream reaches affected by the Drum-Spaulding Project are discussed below by development in general upstream to downstream order.

Spaulding No. 3 Development

All lakes and stream reaches affected by the Spaulding No. 3 Development are located in higher elevation portions of the project, and the hydrology of these waters is strongly influenced by natural patterns of winter precipitation and snowmelt during late spring and early summer. Most of these stream reaches receive flow releases from small headwater reservoirs. The small storage capacities and small drainage areas of these reservoirs restrict the instream flow that can be released to a narrow range without depleting storage that would otherwise support downstream instream flow needs later in the season. Establishing minimum streamflows for these stream reaches is based, to some extent, on the operational flexibility at each facility. Many of these project-affected stream reaches would be dry during late summer and fall in many years under unregulated conditions.

PG&E used CFR modeling to evaluate the response of aquatic habitat to flow in these low flow stream reaches. Wetted perimeter and average depth calculated for each stream reach-specific proposed minimum flow are summarized in table 3-101. Within the operational capacity of these facilities, PG&E proposes minimum streamflows similar to natural unregulated flows, but generally higher minimum streamflows during late summer. PG&E also proposes a measure for intermittent flow setting at these remote locations for compliance with minimum streamflows (section 3.3.2.2.5, *Monitoring Compliance with Instream Flows*), particularly during winter months when access can be very difficult and unsafe.

Texas Creek Below Upper Rock Lake Dam

PG&E proposes to provide minimum streamflows of 0.1 cfs or 0.25 cfs, depending on water year type, in Texas Creek between Upper and Lower Rock Lake (table 3-102). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

This reach of Texas Creek is extremely short (0.1 mile). PG&E and the relicensing stakeholders did not perform a habitat-flow assessment for this stream reach, but proposes the same minimum flows as proposed for the next downstream reach below Lower Rock Lake. The existing license includes minimum stream flows of 0.1 cfs (with a target flow of 0.25 cfs) during July to September. Proposed minimum flows were based on a rule curve analysis for Upper Rock Lake to determine the operationally feasible minimum flows. Except during March through May, the period of high natural flows, the minimum flows that PG&E proposes are higher in all water years than the lower end of the historical flow range (90 percent exceedance) for this stream reach. Under the existing license, during critical summer periods (June through November), this reach of Texas Creek is typically dry at historical median flow conditions; under estimated unregulated conditions, the downstream reach below Lower Rock Lake at median flows would be dry between July and October. The proposed flows would ensure minimum flows of at least 0.1 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. During the high spring flow season (March through May), PG&E's proposed flows are significantly less than historical median flows. These historical flows are representative of conditions with the same minimum flow requirement for this stream reach from July through September under the existing license; it is likely that elevated spring runoff conditions would be similar to those observed historically, which would result in similar higher seasonal releases/spills.

The proposed year round minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, the same minimum flow requirement applies from July through September, and this stream reach generally does not go dry. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods.

Texas Creek Below Lower Rock Lake Dam

PG&E proposes to provide minimum streamflows of 0.1 cfs or 0.25 cfs, depending on water year type, in Texas Creek downstream from Lower Rock Lake (table 3-103). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at two study sites in this reach of Texas Creek. The average wetted width at the upstream study sites was less than 12 feet, and average depth was less than 0.75 foot; at the downstream study sites, average wetted width was less than 15 feet and depth was less than 1 foot. Because the range of study flows (1.08 to 5.77 cfs) and associated model flow range (0.43 to 14.5 cfs) were above the proposed minimum streamflows, the results do not provide useful information to evaluate the available aquatic habitat under the proposed flows.

The existing license includes minimum stream flows of 0.1 cfs (with a target flow of 0.25 cfs) during July to September. Median historical flows in this stream reach under the existing license are higher than the proposed minimum streamflows. Under estimated unregulated conditions, the reach of Texas Creek below Lower Rock Lake would be dry 50 percent of the time during the months of July through October. The proposed flows would ensure minimum flows of at least 0.1 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. During the high spring flow season (March through May), PG&E's proposed flows are significantly less than historical median flows. These historical flows are representative of conditions with the same minimum flow requirement for this stream reach under the existing license; it is likely that elevated spring runoff conditions would be similar to those observed historically, which would result in similar seasonal higher releases/spills as under the existing license.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, the same minimum flow requirement applies from July through September, and this stream reach generally does not go dry. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods.

Unnamed Tributary Below Culbertson Lake Dam

PG&E proposes to provide minimum streamflows from 0.3 cfs to 1.5 cfs, depending on water year type, and month in the unnamed tributary to Texas Creek downstream from Culbertson Lake (table 3-104). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this stream reach below Culbertson Lake. The average wetted width was less than 8 feet, and average depth was less than 0.75 foot. PG&E's proposed minimum streamflows range from 0.3 cfs to 1.5 cfs, depending on month and water year type; the CFR model for this stream reach is appropriate over a range of 0.75 to 8.2 cfs. Proposed minimum streamflows for extreme critically dry and critically dry years are below the modeled range of flow. The effect of flow on habitat (wetted perimeter) is greater for changes at low flows than at higher flows. Wetted perimeter as an index of habitat increases sharply with flow up to a breakpoint at about 1.5 cfs (figure 3-17⁹), the minimum flow proposed for above normal and wet years. Wetted perimeter increases by about 20 percent as flow increases from 0.5 cfs to 1.5 cfs. Because of the channel profile (relatively steep sided) in this stream reach, at these minimum flows the wetted perimeter and width change relatively little compared to depth.

Median historical flows (0.7 to 0.9 cfs) in this stream reach under the existing license are higher than the proposed minimum streamflows during extreme critically dry, critically dry, dry, and below normal years. Under estimated unregulated conditions in the stream reach below Culbertson Lake, the median flow would be less than PG&E's proposed flows during the months of July through November. The proposed flows would ensure minimum flows of at least 0.3 cfs throughout the year even in extreme critically dry and critically dry years, which is higher than estimated for unregulated conditions in summer and fall. During the high spring flow season (March through May), the proposed flows are

⁹ The figures referenced in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, are provided in appendix B-2.

slightly less than historical median flows, except during above normal and wet years. These historical flows are representative of conditions with a minimum flow requirement of 0.3 cfs throughout the year in all years, but with a target of 0.75 cfs whenever possible under the existing license; it is likely that elevated spring runoff conditions would be similar to those observed historically, which would result in similar seasonal higher releases/spills.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, this stream reach does not go dry. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods.

Lindsey Creek Below Middle Lindsey Lake Dam

PG&E proposes to provide minimum streamflows of 0.1 cfs or 0.2 cfs, depending on water year type, in Lindsey Creek, a tributary of Texas Creek, downstream from Middle Lindsey Lake (table 3-105). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this stream reach of Lindsey Creek. The average wetted width at the study site was less than 7 feet, and average depth was less than 0.6 foot. Because the range of study flows (0.51 to 1.59 cfs) and associated model flow range (0.25 to 3.98 cfs) were above the proposed minimum streamflows (0.1 to 0.2 cfs), the results do not provide particularly useful information to evaluate the available aquatic habitat under the proposed flows. However, between 0.25 cfs and 0.5 cfs (upper limit of proposed minimum streamflows), the wetted perimeter increases by about 20 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-18), the stakeholders' target for summer flows.

Median historical flows in this stream reach are higher under the existing license than the proposed minimum streamflows, except in November and December when the historical median is 0 cfs. Under estimated unregulated conditions, the reach of Lindsey Creek below Middle Lindsey Lake would be below the proposed minimum flow 50 percent of the time during the months of July through November. The proposed flows would ensure minimum flows of at least 0.1 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. The historical flows for this stream reach under the existing license are representative of conditions with minimum flow requirements similar to the proposed minimum streamflows, 0.1 cfs minimum with a target of 0.25 cfs whenever possible.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, similar minimum flow requirements apply, although they can be adjusted downward to account for evaporation during particularly dry periods. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher flows (0.2 cfs) during below normal, above normal, and wet years.

Lindsey Creek Below Lower Lindsey Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs or 0.7 cfs, depending on water year type, in Lindsey Creek, a tributary of Texas Creek, downstream from Lower Lindsey Lake (table 3-106). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this stream reach of Lindsey Creek. The average wetted width at the study site was less than 15 feet, and average depth was less than 0.75 foot. Because the range of study flows (1.03 to 2.45 cfs) and associated model flow range (0.5 to 6.13 cfs) do not capture the full range of proposed minimum streamflows (0.2 to 0.7 cfs), the results do not provide particularly useful information to evaluate the available aquatic habitat under the proposed flows for extreme critically dry and critically dry years. However, between 0.5 cfs and 1 cfs (upper limit of proposed minimum streamflows), the wetted perimeter increases by about 20 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-19), the stakeholders' target for summer flows.

The existing license includes minimum stream flows of 0.2 cfs (with a target flow of 0.5 cfs) year round in all years. Median historical flows in this stream reach are higher under the existing license than the proposed minimum streamflows, except in April and May when the historical median is 0.6 cfs (no data were provided for February and March). Under estimated unregulated conditions, the reach of Lindsey Creek below Lower Lindsey Lake dam would be at or below the proposed minimum flow 50 percent of the time during the months of July through November. The proposed flows would ensure minimum flows of at least 0.2 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows are significantly less than unregulated peak median flows during spring (March to May).

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, minimum flow requirements are similar to PG&E's proposed flows for extreme critically dry, critically dry, and dry years. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher flows (0.7 cfs) during below normal, above normal, and wet years than are specified under the existing license.

Lake Creek Below Feeley Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs to 1.0 cfs, depending on water year type, in Lake Creek downstream from Feeley Lake (table 3-107). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders did not evaluate the relationship between flow and aquatic habitat in this very short (0.1 mile) reach of Lake Creek. Under estimated unregulated conditions, the reach of Lake Creek below Feeley Lake dam would be at or below the proposed minimum flow (0.2 to 1.0 cfs) 50 percent of the time during the months of July through November. The minimum

streamflow requirement in this stream reach under the existing license is 0.2 cfs, with a target flow of 0.5 cfs year round. The proposed flows would ensure minimum flows of at least 0.2 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. During below normal, above normal, and wet years, proposed minimum streamflows would be higher than median flows under the existing license throughout the year.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, minimum flow requirements are similar to PG&E's proposed flows for extreme critically dry, critically dry, and dry years. The range of flows in this stream reach is likely to be slightly higher than existing conditions. The proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher flows (1.0 cfs) during below normal, above normal, and wet years than are specified under the existing license.

Lake Creek Below Carr Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs to 1.0 cfs, depending on water year type, in Lake Creek downstream from Carr Lake (table 3-108). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at two study sites in this reach of Lake Creek. The average wetted width at the study sites was less than 8 feet, and average depth was less than 0.8 foot. The range of study flows (0.58 to 2.82 cfs) and associated model flow range (0.5 to 7.05 cfs) do not capture the full range of proposed minimum streamflows (0.2 to 1.0 cfs) necessary to evaluate the available aquatic habitat under the proposed flows for extreme critically dry and critically dry years. However, between about 0.3 cfs and 1 cfs (upper limit of proposed minimum streamflows), the wetted perimeter increases by about 18 to 35 percent to a breakpoint in the percent wetted perimeter/flow curves (the relicensing stakeholders' target for summer minimum streamflows) for the two study stream reaches in this part of Lake Creek (figures 3-20 and 3-21).

The existing license includes minimum stream flows of 0.2 cfs (with a target flow of 0.5 cfs) year round in all years. Median historical flows in this stream reach under the existing license are higher than the proposed minimum streamflows. Under estimated unregulated conditions, the reach of Lake Creek below Carr Lake would be at or below the proposed minimum flow 50 percent of the time during the months of July through November. The proposed flows would ensure minimum flows of at least 0.2 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows are significantly less than peak median flows under the existing license during spring (March to May).

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, minimum flow requirements are similar to PG&E's proposed flows for extreme critically dry, critically dry, and dry years. The range of flows under the proposed alternative in this stream reach is likely to remain similar to existing license conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher flows (1 cfs) during below normal, above normal, and wet years than are specified under the existing license.

Rucker Creek Below Blue Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs to 0.5 cfs, depending on water year type, in Rucker Creek downstream from Blue Lake (table 3-109). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this reach of Rucker Creek. The average wetted width at the study site was less than 10 feet, and average depth was less than 0.75 foot. Because the range of study flows (0.59 to 2.07 cfs) and associated model flow range (0.5 to 5.18 cfs) do not capture the range of proposed minimum streamflows (0.2 to 0.5 cfs), the results do not provide adequate information to fully evaluate the available aquatic habitat under the proposed flows for extreme critically dry and critically dry years. However, between 0.3 cfs and 1 cfs, the wetted perimeter increases by about 20 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-22), the stakeholders' target for summer minimum streamflows.

The existing license includes minimum stream flows of 0.2 cfs (with a target flow of 0.5 cfs) year round in all years. Under estimated unregulated conditions, the reach of Rucker Creek below Blue Lake would be less than the proposed minimum flow 50 percent of the time during the months of July through November. The proposed flows would ensure minimum flows of at least 0.2 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows are significantly less than peak median unregulated flows (1.2 to 2.9 cfs) during spring (March to May). PG&E did not present historical flow frequency data for comparison to proposed minimum flow conditions.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, minimum flow requirements are similar to the proposed flows. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher minimum streamflows (0.5 cfs) during below normal, above normal, and wet years than are specified under the existing license.

Rucker Creek Below Rucker Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs to 1.5 cfs, depending on water year type, in Rucker Creek downstream from Rucker Lake (table 3-110). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this stream reach of Rucker Creek. The average wetted width at the study site was less than 15 feet, and average depth was less than 0.9 foot. The range of study flows (0.56 to 4.63 cfs) and associated model flow range (0.22 to 11.58 cfs) capture the range of proposed minimum streamflows (0.2 to 1.5 cfs). Between 0.2 cfs and 2 cfs, the wetted perimeter increases by about 22 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-23), the stakeholders' target for summer minimum streamflows.

Under estimated unregulated conditions, the stream reach of Rucker Creek below Rucker Lake dam would be at or below the proposed minimum flow 50 percent of the time during the months of July through October in critically dry and extreme critically dry years, and during the months of July through November in below normal, above normal, and wet years. The proposed flows would ensure minimum flows of at least 0.2 cfs throughout the year even in extreme critically dry years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows are significantly less than peak median flows under existing conditions during spring (March to May). PG&E did not present historical flow frequency data for comparison to proposed minimum flow conditions.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, minimum flow requirements are similar to proposed flows for extreme critically dry, critically dry, and dry years. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods and would provide higher minimum streamflows (0.75 to 1.5 cfs) during below normal, above normal, and wet years than are specified under the existing license (0.2 to 0.5 cfs).

Unnamed Tributary Below Fuller Lake Dam

PG&E proposes to provide minimum streamflows of 0.25 cfs year round in all years in the unnamed tributary to Jordan Creek downstream from Fuller Lake (table 3-111). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in this stream reach below Fuller Lake dam. The average wetted width at the study site was less than 9 feet, and average depth was less than 1.0 foot. Because the range of study flows (0.82 to 3.67 cfs) and associated model flow range (0.33 to 9.18 cfs) do not include the proposed minimum streamflows (0.25 cfs), the results do not provide adequate information to evaluate fully the available aquatic habitat under the proposed flows for all years. However, between 0.3 cfs and 1 cfs the wetted perimeter increases by about 10 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-24), the stakeholders' target for summer minimum streamflows.

Under estimated unregulated conditions, flow in the stream reach below Fuller Lake dam would be less than the proposed minimum flow 50 percent of the time during the months of July through November. The proposed flows would ensure minimum flows of at least 0.25 cfs throughout the year under all years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows are significantly less than peak median unregulated flows (2.9 to 6.1 cfs) during spring (March to May). PG&E did not present historical flow frequency data for comparison to proposed minimum flow conditions.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. Under the existing license, there are no minimum flow requirements. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods.

Spaulding No. 1 and No. 2 Development

All lakes and stream reaches affected by the Spaulding No. 1 and No. 2 Development upstream of Lake Spaulding are located in higher elevation portions of the project; the hydrology of these waters is strongly influenced by natural patterns of winter precipitation and snowmelt during late spring and early summer. Most of these stream reaches receive releases from small headwater reservoirs. The small storage capacities and small drainage areas of these reservoirs restrict the instream flow that can be released to a narrow range without depleting storage that would otherwise support downstream instream flow needs later in the season. Establishing minimum streamflows for these stream reaches are based, to some extent, on the operational flexibility at each facility. Many of these project-affected stream reaches would be dry in many years under unregulated conditions. Within the operational capacity of these facilities, PG&E proposes minimum streamflows similar to natural unregulated flows and generally higher during late summer. PG&E also proposes a measure for intermittent flow setting at these remote locations for compliance with minimum streamflows (section 3.3.2.2.5, *Monitoring Compliance with Instream Flow Measures*), particularly during winter when access can be very difficult and unsafe.

Unnamed tributary Below Meadow Lake Dam

PG&E proposes to provide minimum streamflows of 1 cfs to 11 cfs, depending on month, in all years in the unnamed tributary to Fordyce Lake downstream from Meadow Lake (table 3-112). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR method to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in the stream reach below Meadow Lake dam. The average wetted width at the study site was less than 15 feet, and average depth was less than 1.1 feet. The range of study flows (1.42 to 11.33 cfs) and associated model flow range (0.57 to 28.33 cfs) capture the range of proposed minimum streamflows (1 to 11 cfs). Between 1 cfs and 11 cfs, the wetted perimeter increases by about 35 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-25), the stakeholders' target for summer minimum flow.

PG&E did not present a frequency analysis for historical flows. Under estimated unregulated conditions, median flows in the stream reach below Meadow Lake dam would be less than the proposed minimum flow during the months of July through December. No minimum streamflows are required for this stream reach under the existing license. The proposed flows would ensure minimum flows of at least 1 cfs throughout the year in all years, which is higher than estimated for unregulated conditions in summer and fall. Proposed minimum streamflows increase from 1 cfs up to 11 cfs and back to 1 cfs during July in all years.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would frequently be dry under natural unregulated conditions. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods.

White Rock Creek Below White Rock Diversion Dam

PG&E proposes to provide minimum streamflows of 0.5 cfs to 1 cfs, depending on water year type, in White Rock Creek, a tributary to North Creek (which flows into Fordyce Lake) downstream from

White Rock Lake dam (table 3-113). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR method to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in the stream reach below Meadow Lake. The average wetted width at the study site was less than 10 feet, and average depth was less than 1 foot. The range of study flows (0.45 to 1.81 cfs) and associated model flow range (0.18 to 4.53 cfs) capture the range of proposed minimum streamflows (0.5 to 1 cfs). Between 0.5 cfs and 1 cfs, the wetted perimeter increases by about 5 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-26), the stakeholders' target for summer minimum flow.

PG&E did not present a frequency analysis for historical flows under the existing license for White Rock Creek. Under the existing license, there are no minimum streamflows for this stream reach. Under estimated unregulated conditions, median flows in the reach of White Rock Creek below White Rock Lake dam would be at or less than the proposed minimum flow during the months of July through November. The proposed flows would ensure minimum flows of at least 0.5 cfs throughout the year in extreme critically dry to below normal years, which is higher than estimated for unregulated conditions in summer and fall.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods and would provide higher flows (1 cfs) during above normal and wet years.

Bloody Creek Below Lake Sterling Dam

PG&E proposes to provide minimum streamflows of 0.5 cfs to 1.5 cfs, depending on month and water year type, in Bloody Creek, a tributary to Fordyce Lake downstream from Lake Sterling dam (table 3-114). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Under the existing license, there are no requirements for minimum streamflows in the stream reach below Lake Sterling dam. PG&E did not present a frequency analysis of historical flows for this stream reach and did not analyze the relationship between flow and aquatic habitat in the stream reach below Lake Sterling dam.

Estimated unregulated median flows in the stream reach below Lake Sterling dam would be less than the proposed minimum streamflows during the months of July through October. Under the existing license, there are no minimum streamflows for this stream reach. The proposed flows would ensure minimum flows of at least 0.5 cfs throughout the year in extreme critically dry to below normal years, which is higher than estimated for unregulated conditions in summer and fall.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. The proposed minimum streamflows would ensure that the stream reach remains

inundated throughout the year even during the driest periods and would provide higher flows (1 to 1.5 cfs) during above normal and wet years.

Fordyce Creek Below Fordyce Lake Dam

Streamflows in Fordyce Creek downstream from Fordyce Lake dam would be affected by two proposed measures: (1) *Minimum Streamflows*; and (2) *Fordyce Lake Drawdown*. PG&E proposes to provide minimum streamflows of 15 cfs to 45 cfs, depending on month and water year type, in Fordyce Creek downstream from Fordyce Lake dam (table 3-115). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

In addition to minimum streamflows for the Fordyce Lake dam stream reach, PG&E proposes (DS-AQR1, Part 5, *Fordyce Lake Drawdown*) to release higher flows to Fordyce Creek from Fordyce Lake dam during spring to early summer, which is consistent with Forest Service condition 29 and California Fish and Wildlife recommendation 2.2. Each year when spills cease at both Fordyce Lake dam and Lake Spaulding dam and at such time that the Fordyce Lake dam can be safely accessed, PG&E would release “high target flows” at Fordyce Lake dam in the range of 250 to 475 cfs as long as the release would not result in continued spill at Lake Spaulding. These high target flows would be provided primarily to accommodate whitewater recreational boating (section 3.3.5.2, *Recreation Resources*) during spring and summer and are similar to estimated median unregulated flows during April to May. This measure would also move more cold water into Lake Spaulding earlier in the year, supporting the proposed Supplemental Flow releases to the South Yuba River below Spaulding Lake dam (section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*). The Fordyce Lake release would continue at this rate until available storage in Fordyce Lake is reduced to 29,000 acre-feet. The next 19,000 to 21,500 acre-feet of storage would be apportioned and released evenly through the end of the water year (October), leaving about 7,500 to 10,000 acre-feet of target holdover storage to meet minimum streamflow requirements through the winter. Apportioning releases from water storage in Fordyce Lake would provide the monthly specified minimum streamflow for Fordyce Creek (table 3-115).

For a 10-day period beginning the third week of August, PG&E proposes to hold flow in Fordyce Creek below Fordyce Lake at 50 cfs to accommodate creek crossing by four-wheel recreational vehicles during the Sierra Trek event (section 3.3.5.2, *Recreation Resources*); depending on water year type, minimum streamflows during this period would otherwise be 10 to 40 cfs.

Our Analysis

The PG&E proposed minimum streamflows of 15 to 45 cfs would be 3 to 9 times higher than under the existing license (5 cfs). Under estimated unregulated conditions, Fordyce Creek median flows are less than historical median flows under the existing license and would be less than proposed minimum streamflows during the months of June through November. Highest median monthly flows (128 to 265 cfs) historically occur from June through August. These flows are similar to peak median unregulated flows (100 to 455 cfs), which would occur in March to June. Less frequent peak monthly flows, represented by the 10 percent exceedance, exhibit the same shift to later in the year in the historical data under the existing license compared to estimated unregulated conditions. These historical flows are representative of conditions with a minimum flow requirement of 5 cfs throughout the year and in all years under the existing license. Minimum historical monthly flows, represented by the 90 percent exceedance flow, range from about 5 to 9 cfs in September through March and 12 to 37 cfs in May through August, and were consistently higher than the required 5 cfs minimum flow in the existing license. It is likely that elevated spring runoff conditions under the new license would be similar to those observed historically under the existing, which would result in similar seasonally higher releases/spills. The highest proposed minimum streamflows would occur in May and June similar to the peak period for

estimated unregulated flows. The proposed flows would ensure minimum flows of at least 15 cfs from late fall through mid-spring in extreme critically dry to dry years and would increase to 20 to 25 cfs in wetter years. From May through September, proposed minimum flows would range from 20 to 45 cfs, depending on month and water year type. During the high spring flow season (March through May), proposed flows are slightly less than historical median flows except during above normal and wet years.

The seasonal use of this stream reach by various life stages of resident rainbow trout is depicted relative to historical flows under the existing license and estimated unregulated flows in figure 3-27. Habitat-flow simulations for spawning and fry, juvenile, and adult life stages (figure 3-28) demonstrate that maximum WUA for spawning, fry, and juveniles is associated with flows of 50 cfs or less. Proposed minimum streamflows are 15 to 45 cfs for much of the period of occurrence for these life stages and uses (April to August). Under the proposed minimum streamflows, available habitat (as percent of maximum available WUA) is 87 percent or higher throughout the year in all years for juvenile rainbow trout (table 3-116). Available habitat for spawning is 94 percent or higher in May and June of all years, 66 percent in April of extreme critically dry, critically dry, and dry years, and 79 to 88 percent in below normal to wet years (table 3-116). Proposed minimum streamflows are predicted to provide 78 to 97 percent of maximum WUA for adult trout during critical low flow summer periods (May to October) and, during winter and early spring, 69 percent of maximum in extreme critically dry to dry years, and greater than 78 percent in below normal to wet years (table 3-116). The available habitat for these life stages would be consistently higher for the proposed minimum streamflows than that provided under the existing license; proposed flows generally enhance conditions compared to median historical flows under the existing license and estimated unregulated flow conditions.

In general, the HEA analysis indicates that available habitat (WUA) for adults is closer to maximum more frequently at the proposed minimum streamflows than at historical flows under the existing license or estimated unregulated flows during the critical low flow period from July through November (figure 3-29 provides an example for August and September). From December through March, the frequency curves are more similar, and the relative relationship of the three flow scenarios (proposed, historic existing license, estimated unregulated) varies from month to month. In April and May, habitat frequency curves for historical and proposed flows are higher than for unregulated flows; higher habitat availability at historical flows would be slightly more frequent than for proposed flows. The differences observed in April and May increase in June. During the early spawning season (March and April), available spawning habitat is closer to maximum more frequently under proposed and historical flows than under estimated unregulated flows (figure 3-30). In the mid to late spawning season (May and June), proposed flows provide more than 90 percent of maximum habitat.

PG&E does not provide an analysis of percent of maximum WUA or HEA for rainbow trout fry. Maximum habitat for fry (about 13,000 WUA) occurs near the low end of modeled flows, about 20 cfs; declines sharply to less than 5,000 WUA as flows increase to about 75 cfs; and is relatively constant (about 3,000 to 4,000 WUA) above 200 cfs (figure 3-28). The high flows proposed during the Fordyce Lake drawdown (250 to 475 cfs) that support recreational boating and the August recreational vehicle Sierra Trek event (50 cfs) (section 3.3.5.2, *Recreation Resources*) could result in a reduction in available fry habitat (20 to 30 percent of maximum WUA).

The Fordyce Lake drawdown is proposed to provide additional recreational boating opportunities in Fordyce Creek (section 3.3.5.2, *Recreation Resources*) and secondarily to supplement coldwater storage downstream in Lake Spaulding to support the proposed South Yuba River supplemental flow measure below Lake Spaulding (section 3.3.2.2.7). The Fordyce Lake drawdown measure would result in lower water levels in Fordyce Lake earlier in the summer than under the existing license; however, by the end of each water year (October), water level in Fordyce Lake would be similar under both the proposed condition and the existing license (table 3-117).

The minimum streamflows proposed by PG&E and the relicensing stakeholders for Fordyce Creek between Fordyce Lake and Lake Spaulding would enhance existing habitat conditions for resident rainbow trout, generally providing habitat in excess of 80 percent of the maximum WUA.

Unnamed tributary Below Kidd Lake Dam

PG&E proposes to provide minimum streamflows of 0.5 cfs to 1.0 cfs, depending on month and water year type, to the unnamed tributary to upper South Yuba River downstream from Kidd Lake dam (table 3-118). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR method to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in the stream reach below Kidd Lake. The average wetted width at the study site was less than 7 feet, and average depth was less than 0.5 feet. The range of study flows (0.17 to 4.04 cfs) and associated model flow range (0.7 to 10.10 cfs) capture the range of proposed minimum streamflows (0.5 to 1 cfs). Between 0.5 cfs and 1 cfs, the wetted perimeter increases by about 20 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-31), the stakeholders' target summer flow.

PG&E did not present a frequency analysis for historical flows under the existing license for the stream reach below Kidd Lake. Under the existing license, there are no minimum streamflows for this stream reach. Under estimated unregulated conditions, median flows in the stream reach below Kidd Lake dam would be at or less than the proposed minimum flow during the months of July through December. The proposed flows would ensure minimum flows of at least 0.5 cfs throughout the year in extreme critically dry to dry years, which is higher than estimated for unregulated conditions in summer and fall. During below normal to wet years, proposed minimum streamflows in June would increase to 0.75 to 1.0 cfs, slightly less than the estimated unregulated median flow in this stream reach during June.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods, and would provide higher flows (1 cfs) during June in below normal to wet years.

Cascade Creek Below Lower Peak Lake Dam

PG&E proposes to provide minimum streamflows of 0.5 cfs to 1.0 cfs, depending on month and water year type, to Cascade Creek (a tributary to upper South Yuba River) downstream from Lower Peak Lake dam (table 3-119). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR method to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in Cascade Creek below Lower Peak Lake dam. The average wetted width at the study site was less than 15 feet, and average depth was less than 1 foot. The range of study flows (3.47 to 8.18 cfs) and associated model flow range (1.39 to 20.45 cfs) do not capture the range of proposed minimum streamflows (0.5 to 1 cfs); the

percent change in wetted perimeter versus flow curve generated from this model does not provide adequate information to evaluate the relationship between habitat and flow for this stream reach.

PG&E did not present a frequency analysis for historical flows under the existing license for this reach of Cascade Creek. Under the existing license, there are no minimum streamflows for this stream reach. Under estimated unregulated conditions, median flows in this reach of Cascade Creek would be at or less than the proposed minimum flow during the months of July through November. The proposed flows would ensure minimum flows of at least 0.5 cfs throughout the year in extreme critically dry to dry years, which is higher than estimated for unregulated conditions in summer and fall. During below normal to wet years, proposed minimum streamflows in June would increase to 0.75 to 1.0 cfs, slightly less than the estimated unregulated median flow in this stream reach during June.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated conditions. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods and would provide higher flows (1 cfs) during June in below normal to wet years.

South Yuba River Below the Confluence of Unnamed Tributary Below Kidd Lake and Cascade Creek

PG&E proposes minimum streamflows (table 3-120) of 5 cfs year round during all water year types in the upper South Yuba River at Cisco. Flow at this location is the aggregate of releases from Kidd Lake and Lower Peak Lake, and upstream stream reaches of the upper South Yuba River. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR method to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in upper South Yuba River downstream of the confluence of Cascade Creek and the tributary from Kidd Lake. The average wetted width at the study site was less than 4 feet, and average depth was less than 1.5 feet. The range of study flows (0.25 to 4.04 cfs) and associated model flow range (0.1 to 10.1 cfs) captures the proposed minimum streamflows (5 cfs year round). Over a flow range of 0.1 to 1 cfs, the wetted perimeter increases a little more than 20 percent to a breakpoint in the percent wetted perimeter/flow curve (figure 3-32), the stakeholders' target summer flow.

Under the existing license, minimum flow for this stream reach is the same as the proposed action, 5 cfs. Historical median monthly flows in this stream reach of the upper South Yuba River are similar to estimated unregulated flow conditions in magnitude and seasonal timing except in September and October, when unregulated median flows would be about a third of historical median flows under the existing license. Under estimated unregulated conditions, median flows in this reach of upper South Yuba River would be at or less than the proposed minimum flow during the months of August through October. The proposed flows would ensure minimum streamflows of at least 5 cfs throughout the year in all years, which is higher than estimated for unregulated conditions in late summer and early fall.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer and would be higher than under natural unregulated conditions. The range of flows in this stream reach is likely to remain similar to existing conditions.

South Yuba River Below Lake Spaulding Dam

Streamflows in the South Yuba River downstream from Lake Spaulding dam would be influenced by three proposed flow measures: (1) *Minimum Streamflows*; (2) *Spill Cessation*, section 3.3.2.2.4; and (3) *Flow Augmentation for Temperature Management*, section 3.3.2.2.7. PG&E proposes to provide minimum streamflows of 10 to 90 cfs, depending on month and water year type, in South Yuba River downstream from Lake Spaulding dam (table 3-121). In the case where a critically dry year is preceded by a critically dry or extreme critically dry year, the Forest Service (condition 29) specifies and California Fish and Wildlife recommends the year be treated as an extreme critically dry year where minimum streamflow would be reduced from 20 to 10 cfs for the period from September 1¹⁰ to June 14 but would be 20 cfs from June 15 to August 31; PG&E's proposed minimum streamflow under such extended drought conditions would be 10 cfs throughout the year, including the June 15 to August 31 period. In proposing alternatives to the Forest Service conditions, PG&E indicated that, although it prefers a minimum flow of 10 cfs for this period, it could operate effectively with minimum streamflows in the range of 10 to 20 cfs specified by the Forest Service and recommended by California Fish and Wildlife for this stream reach.

To support eventual reintroduction of spring-run Chinook salmon and winter Central Valley steelhead or winter steelhead alone, NMFS provided 10(j) flow recommendations for South Yuba River below Lake Spaulding dam (table 3-122). NMFS' flow recommendations are the same across all water year types; if adequate water storage is not available in extreme critically dry years to meet the NMFS recommended flows, PG&E would be required to confer with the Commission, NMFS, PG&E, the U.S. Army Corps of Engineers, and other entities involved in the restoration.

Our Analysis

PG&E's proposed minimum streamflows (10 to 90 cfs) would be 2 to 18 times higher than under the existing license. Under the existing license there are two minimum streamflow requirements in this stream reach: (1) 1 cfs below Lake Spaulding dam at YB-116; and (2) 5 cfs at Lang's crossing (YB-29) downstream of the confluence of Jordan Creek. Proposed minimum streamflows apply at the more downstream location (YB-29) and no minimum streamflow compliance is proposed at the more upstream location.

The proposed 20-cfs minimum streamflow during summer would provide a considerable improvement in available aquatic habitat, particularly during exceptionally dry periods compared to the existing license. Under the existing license, historical median monthly flows in this stream reach are less than 10 cfs from June through December and between 12 and 24 cfs the rest of the year. Estimated unregulated median monthly flows from July through November would be 31 cfs or less; median monthly flows increase from December to the peak of 1,585 cfs in May. Lowest historical monthly flows, represented by the 90 percent exceedance flow, range from 5 to 7 cfs under the existing license; estimated unregulated flows at the 90 percent exceedance range from about 5 to 450 cfs, with flows of 400 to 450 cfs in April and May. Historical maximum monthly flows, represented by the 10 percent exceedance, range from 8 to 1,320 cfs under the existing license and 30 to 3,165 cfs for estimated unregulated conditions; the highest monthly flows occur in May through June under both the existing license and unregulated conditions. The highest proposed minimum streamflows would occur in April to June,

¹⁰ The Forest Service minimum streamflow table for the South Yuba River below Lake Spaulding dam has a discrepancy between the table values and the footnote that relates to back-to-back extreme critically dry/critically dry years; the table entries show 20 cfs during September of an extreme critically dry year, while the footnote indicates that the flows should be the same as October through June 14, "10*/20." The Forest Service has indicated that the footnote should prevail (November 27, 2012).

similar to estimated peak unregulated flows, but would be one to two orders of magnitude lower than unregulated flows.

The seasonal use of this stream reach by various life stages of resident rainbow trout is depicted relative to historical flows under the existing license and estimated unregulated flows in figure 3-33. Habitat-flow simulations for spawning and fry, juvenile, and adult life stages the South Yuba River below Jordan Creek (figure 3-34) and below Canyon Creek (figure 3-35) demonstrate that 80 percent of maximum WUA for spawning, adult, and juvenile rainbow trout is associated with flows of about 58, 57, and 14 cfs, respectively. Proposed minimum streamflows are greater than 50 cfs in April to June (primary spawning period) in below normal to wet years and 30 to 60 cfs in critically dry and dry years. Under the proposed minimum streamflows, available habitat (as percent of maximum available WUA) is 90 percent or higher throughout the year in all years for juvenile rainbow trout (table 3-123). Available habitat for spawning is 77 percent or higher in May and June of below normal to wet years, 53 percent in April to June of extreme critically dry years, and 64 to 81 percent in critically dry to dry years (table 3-123). Proposed minimum streamflows are predicted to provide 40 to 55 percent of maximum WUA for adult trout from mid-September through January. Adult habitat is close to or exceeds 80 percent of maximum from April to June of below normal and wetter years (table 3-123). The available habitat for these life stages is consistently higher than minimum streamflows provided under the existing license, and generally enhances conditions compared to median flows under the existing license and estimated unregulated flow conditions.

In general, the HEA analysis indicates that available habitat (WUA) for adults is closer to maximum more frequently under the proposed minimum streamflows than at historical regulated flows under the existing license or estimated unregulated flows during the critical low flow period from July through November (figure 3-36 provides an example for August and September). From December through March, a higher percentage of habitat would be available more often with unregulated flows, and proposed minimum streamflows provide considerably more habitat than historical flows under the existing license. In April and May, habitat frequency curves for unregulated and proposed flows are similar and higher than with historical flows under the existing license. These differences increase in June and July. During the early spawning season (March and April), available spawning habitat is generally closer to maximum more frequently under proposed and unregulated flows than under historical flows (figure 3-37). In the mid to late spawning season (May and June), proposed flows provide better than 90 percent of maximum habitat.

PG&E does not provide an analysis of percent of maximum WUA or HEA for rainbow trout fry. Maximum habitat for fry (about 20,000 WUA in the Jordan Creek reach and 15,000 in the Canyon Creek reach) occurs near the low end of modeled flows, about 20 cfs, and declines sharply to less than 10,000 WUA as flows increase to about 50 to 60 cfs. WUA is variable above 100 cfs in the Jordan Creek reach (about 8,000 to 11,000 WUA) (figure 3-34) and in the Canyon Creek reach (5,000 to 8,000 WUA). Fry emergence occurs between May and August (figure 3-33); proposed minimum streamflows during this period should provide near 80 percent of maximum WUA or better during extreme critically dry to dry years. Higher flows (90 cfs) in May through June of below normal or wetter years could reduce fry habitat as would unregulated flows during this time frame.

Lower flows in this stream reach provide more habitat for early life stages of foothill yellow-legged frog (table 3-124). Flows of 20 cfs during extreme critically dry years provide 98 percent of maximum habitat for the frog's eggs. Habitat for incubation of the frog's eggs generally exceeds 80 percent in below normal or drier years and declines to 74 percent in above normal and wet years. Habitat for tadpoles exceeds 86 percent in all years from July through September, ranging from 93 percent in extreme critically dry to 86 percent in wet years.

In conjunction with the proposed minimum streamflows, the spill cessation measure for Lake Spaulding (section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuation*) is intended to provide a more gradual reduction of flow, following spill events, to protect aquatic biota from entrapment and stranding as flows decrease and consolidate and portions of the downstream channel dewater. This measure (discussed in more detail in section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuation*) would cause flows to remain higher for longer periods to mimic a more natural recession of flow following spills. The supplemental flow measure (discussed in more detail in section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*) would require release of additional water in excess of the minimum flow requirement from the Lake Spaulding low-level outlet during the summer, to maintain water temperatures at or below 20°C above the confluence of Canyon Creek to benefit resident rainbow trout and protect foothill yellow-legged frog.

NMFS recommended minimum streamflows are associated with a plan for reintroducing spring-run Chinook salmon and Central Valley steelhead to the upper Yuba River upstream of Englebright dam, including South Yuba River below Lake Spaulding dam was included in the *Biological Opinion for Continued Operation and Maintenance of Englebright Dam and Reservoir, Daguerre Point Dam, and Recreational Facilities on and Around Englebright Reservoir* (NMFS, 2012). NMFS expects these reintroduction efforts may occur sometime during any new license term of the Drum-Spaulding and Yuba Bear Projects. The status of the proposal for reintroduction of these species is discussed in more detail in section 3.3.4, *Threatened and Endangered Species*. The timing of the reintroduction is highly uncertain, but NMFS recommends these minimum streamflows for future implementation when reintroduction does occur. The NMFS recommended flows to support this reintroduction in South Yuba River below Lake Spaulding dam are generally higher than those proposed by PG&E, Forest Service 4(e) conditions, and recommended by California Fish and Wildlife; however, during below normal to wet years, PG&E's proposed flows are higher in January to March. PG&E's proposed flows are also higher in April to June during above normal and wet years. Given the uncertain status and progress toward reintroduction of anadromous salmonids in this watershed, establishment and implementation of the flows recommended by NMFS is premature.

The minimum streamflows proposed by PG&E and the relicensing stakeholders for South Yuba River downstream of Lake Spaulding dam would enhance existing habitat conditions for resident rainbow trout and foothill yellow-legged frog, compared to the existing license and estimated unregulated flow conditions. Although adult rainbow trout habitat during extreme critically dry to dry years would be considerably less than maximum, habitat for early foothill yellow-legged frog during spring and summer would approach maximum during these same years.

Deer Creek Development

South Fork Deer Creek Below Deer Creek Powerhouse

PG&E proposes to provide minimum streamflows (table 3-125) of 5 cfs year round and in all years, to the South Fork Deer Creek below the Deer Creek powerhouse. Flow would be measured in the Chalk Bluff canal upstream of the Deer Creek forebay. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E summarized historical flows under the existing license through the Deer Creek powerhouse, but did not present a frequency analysis for unregulated flows because there would be no waterway and no flow at this location without the South Yuba canal, Chalk Bluff canal, and Deer Creek powerhouse. The project-affected stream reach of the South Fork Deer Creek between the powerhouse tailrace and NID's Cascade diversion dam (non-project) is only 0.1 mile long. Under the existing license,

there are no required minimum streamflows for this stream reach. PG&E and the relicensing stakeholders' evaluation of minimum instream flows focused on the need to maintain some water in the channel of South Fork Deer Creek to the Cascade diversion during periods when the Deer Creek powerhouse is out of service and PG&E cannot deliver water to South Fork Deer Creek. When there is not a call for water at NID's Cascade diversion, PG&E would still be responsible for maintaining some flow in this stream reach. Historical median monthly flows through the powerhouse range from 39 to 60 cfs under the existing license except in April when the median flow is 0 cfs. Peak flows, represented by the 10 percent exceedance flow, range from 60 to 91 cfs, and minimum streamflows (90 percent exceedance) are 0 cfs from January through May and about 30 to 50 cfs the rest of the year.

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in the South Fork Deer Creek. The average wetted width at the study site was less than 15 feet, and average depth was less than 1 foot. The range of study flows (35 to 81 cfs) and associated model flow range (14 to 202 cfs) do not capture the proposed minimum streamflows (5 cfs). However, the typical historical flows associated with powerhouse operation (40 to 60 cfs ranging to peaks near 90 cfs) under the existing license provide a 25 to 35 percent increase in the wetted perimeter in South Fork Deer Creek compared to the proposed 5 cfs minimum discharge. These flows do not account for the natural baseflow in South Fork Deer Creek upstream of the powerhouse tailrace. Typically, outages of these canals occur for about 2 weeks in late March to early April when unregulated flows in South Fork Deer Creek are likely to be near peak. Although PG&E did not estimate unregulated hydrology for the South Fork Deer Creek, during these early spring months some upstream flow should exist in South Fork Deer Creek as a result of snow melt and runoff. Under the proposed minimum streamflows, PG&E would be exempt from the minimum flow requirements when the South Yuba canal or Chalk Bluff canal is out of service because there is no natural channel, would be no source of water, and no mechanism for transfer of water to South Fork Deer Creek.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer, irrespective of base flows in South Fork Deer Creek without the powerhouse discharge. This minimum flow would be 5 cfs higher than historical releases between January and May under the existing license. The range of flows in this stream reach is likely to remain similar to existing conditions, but the proposed minimum streamflows would ensure that the stream reach receives at least 5 cfs from the powerhouse throughout the year even during the driest years except during South Yuba or Chalk Bluff canal outages.

Drum No.1 and No. 2 Development

North Fork of the North Fork American River Below Lake Valley Reservoir Dam

PG&E proposes to provide minimum streamflows of 2 cfs to 15 cfs, depending on month and water year type, in the North Fork of the North Fork American River downstream from Lake Valley reservoir dam (table 3-126). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Historical median monthly flows under the existing license for this reach of North Fork of the North Fork American River are 4.2 to 6.0 cfs in June through September and 10.0 to 18.0 cfs the rest of the year. Minimum historical monthly flow (90 percent exceedance) is 0.3 to 3.2 cfs April through October and 3.5 to 10.1 cfs the rest of the year. Maximum flows (10 percent exceedance) range from 19.0 to 43.0 cfs. Under the existing license, there are no minimum streamflows for this stream reach, but by agreement with California Fish and Wildlife PG&E maintains a minimum streamflow of 1 cfs. Under estimated unregulated conditions, North Fork of the North Fork American River median flows would be

less than proposed minimum streamflows during the months of July through November. In wetter years, proposed minimum streamflows would increase during April through June, but would still be less than the estimated unregulated median flows during that period. Highest unregulated median monthly flows (41 to 55 cfs) occur in April through May. Peak (10 percent exceedance flow) unregulated flows (63 to 112 cfs) occur in March through June. Minimum unregulated monthly flows, represented by the 90 percent exceedance flow, range from about 0.1 to 10 cfs in June through March and 14 to 18 cfs in April and May, and were consistently higher than the 1 cfs minimum flow in the existing license. The proposed flows would ensure minimum streamflows of at least 2 to 4 cfs from October to March, depending on water year type. From April through September, proposed minimum streamflows would be 2 cfs in extreme critically dry years, increasing to 6 to 15 cfs in wet years, with peak flows in May. From February through May, proposed flows would be considerably less than estimated unregulated median flows.

Habitat-flow simulations for spawning and rainbow trout fry, juvenile, and adult life stages (figure 3-38) demonstrate that maximum WUA for fry, juveniles, and adults is associated with flows of 10 cfs or less; proposed minimum streamflows are 2 to 15 cfs. Under the proposed minimum streamflows, available habitat (as percent of maximum available WUA) for adult rainbow trout is 64 to 100 percent throughout the year in all years (table 3-127). Percent of maximum WUA for adults exceeds 80 percent from April through September in dry, below normal, and above normal years, and throughout the year in wet years. Available habitat for juvenile rainbow trout ranges from 79 to 100 percent of maximum in all months and years. Peak spawning habitat occurs at flows of about 25 cfs (figure 3-38). Available habitat for spawning exceeds 80 percent in wet years during May and June, and in May of above normal years. During extreme critically dry years, available spawning habitat is 23 percent and ranges from 41 to 57 percent for most of the spawning period in critically dry, dry, and below normal years (table 3-127). The available habitat for these life stages is consistently higher than minimum streamflows provided under the existing license, and generally enhances conditions compared to median flows under estimated unregulated conditions.

In general, the HEA analysis indicates that available habitat (WUA) for adults is closer to maximum more frequently under the proposed minimum streamflows than for historical flows under the existing license or estimated unregulated flows during the critical low flow period from July through November (figure 3-39 provides an example for June and July). From December through May, the frequency curves for the existing license, proposed, and unregulated flows are very similar. In June, the habitat frequency curves for estimated unregulated conditions decline and diverge from the curves for the existing license and proposed conditions; that is, there would be less habitat available under unregulated conditions. From August through November, the frequency curves for the three alternative flow conditions (existing license historical flows, proposed flows, and estimated unregulated flows) remain relatively the same as July. Two study sites were measured in this stream reach, one close to the dam (node 0) and one near the mid-point of the stream reach (node 1); there appear to be distinct differences between these locations relative to spawning habitat. During the early spawning season (March and April), the habitat frequency curves for all three alternative flow conditions are very similar (figure 3-40). At the study location below Lake Valley reservoir dam, there is a sharp break in available habitat under the existing license from near 100 percent of maximum about 35 to 40 percent of the time to 40 percent of maximum for about 60 to 65 percent of the time. Habitat under the proposed minimum streamflows exhibits a similar frequency shift in March, although available habitat frequency curve is not as high as under the existing license historical flows. In April, the proposed flows would result in a frequency distribution more similar to estimated unregulated conditions. Given the stepped character of the curves for the existing license and proposed flows, this may reflect a sharp change in the area inundated and available to spawning rainbow trout.

PG&E does not provide an analysis of percent of maximum WUA or HEA for rainbow trout fry. Maximum habitat for fry (about 9,800 WUA) occurs near the low end of modeled flows, about 3 cfs; declines sharply to less than 3,500 WUA as flows increase to about 25 cfs; and increases gradually to about 7,500 at the model's upper limit, 90 cfs (figure 3-38). The proposed minimum streamflows are likely to support greater than 80 percent of maximum habitat for rainbow trout fry.

The minimum streamflows proposed by PG&E and the relicensing stakeholders for this stream reach of the North Fork of the North Fork American River would enhance existing habitat conditions for resident rainbow trout. Although proposed minimum streamflows would not achieve the target of 80 percent of maximum WUA, they would provide considerably more habitat for a greater duration than under the existing license or estimated unregulated flow conditions.

Sixmile Creek Below Kelly Lake Dam

PG&E proposes to provide minimum streamflows of 0.2 cfs to 0.5 cfs, depending on water year type, in Sixmile Creek downstream from Kelly Lake dam (table 3-128). Forest Service condition 29 species and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in Sixmile Creek below Kelly Lake dam. The average wetted width at the study site was less than 12 feet, and average depth was less than 0.9 foot. The range of study flows (0.33 to 1.06 cfs) and associated model flow range (0.13 to 2.65 cfs) capture the range of proposed minimum streamflows (0.2 to 0.5 cfs). Percent change in wetted perimeter as an index of change in available habitat (figure 3-41) indicates that a change in minimum flow from 0.2 to 0.5 cfs would result in a 20 percent increase in wetted perimeter, with a break point in the curve at about 0.5 cfs, the relicensing stakeholder's target for summer flows.

Historical median monthly flows under the existing license for this reach of Sixmile Creek are 0 cfs in July to September and January and February and 0.5 to 2.5 cfs the rest of the year. Minimum historical monthly flow (90 percent exceedance) is 0 cfs year round, and maximum flows (10 percent exceedance) range from 0.5 to 5.6 cfs. Under the existing license, there are no minimum streamflows for this stream reach. Under estimated unregulated conditions, median monthly flows in this reach of Sixmile Creek would be at or less than the proposed minimum flow during the months of July through November. The proposed flows would ensure minimum streamflows of at least 0.2 cfs throughout the year in extreme critically dry to dry years, which is higher than estimated for unregulated conditions in summer and fall.

The proposed minimum streamflows would ensure the availability of aquatic habitat in this stream reach throughout the summer when the stream reach would otherwise be dry under natural unregulated flow conditions. The range of flows in this stream reach is likely to remain similar to flow conditions under the existing license, but the proposed minimum streamflows would ensure that the stream reach remains inundated throughout the year even during the driest periods and would provide higher flows (0.5 cfs) during below normal to wet years.

North Fork of the North Fork American River Below Lake Valley Canal Diversion Dam

PG&E proposes to provide minimum streamflows of 2.2 cfs to 15.5 cfs, depending on month and water year type, in the North Fork of the North Fork American River downstream from Lake Valley canal

diversion dam (table 3-129). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

The minimum streamflow under the existing license by agreement with California Fish and Wildlife in the stream reach downstream from Lake Valley canal diversion dam is 1 cfs from October 1 to May 31 and 3 cfs from June 1 through September 30.

Historical median monthly flows under the existing license are at or less than proposed minimum streamflows from June through December in all years except extreme critically dry years; the highest median monthly flows occur in April and May (21 to 34 cfs). Minimum historical monthly flows (90 percent exceedance flow) are 3 cfs in June to September and near 1 cfs the rest of the year, which are the minimum streamflows specified in the existing license. Maximum historical monthly flows are less than 15 cfs from July through October, with peaks in December (118 cfs) and May (174 cfs).

Under estimated unregulated conditions, North Fork of the North Fork American River median monthly flows would be less than proposed minimum streamflows during the months of July through November in dry, below normal, above normal, and wet years, and July through October in extreme critically dry and critically dry years (table 3-129). In wetter years, proposed minimum streamflows would increase during April through June, creating a more typical seasonal hydrograph, but would still be less than the estimated unregulated median flows during that period. Highest unregulated median monthly flows (84 to 112 cfs) occur in April to May. Peak (10 percent exceedance flow) unregulated flows (133 to 230 cfs) occur in March to June. Minimum unregulated monthly flows, represented by the 90 percent exceedance flow, range from about 0.2 to 6.3 cfs in June through February and 21 to 36 cfs in March through May.

The proposed minimum streamflows would generally ensure flows higher than estimated unregulated conditions from July through November. Although the proposed minimum streamflows would introduce a component of seasonal variability, from December through June proposed flows would still be considerably less than estimated unregulated median flows.

Habitat-flow simulations for rainbow trout fry, juvenile, and adult life stages (figure 3-42) demonstrate a continuous increase in available habitat with flow to the upper limit of the model. PG&E identifies several channel conditions that may cause this idiosyncrasy in the habitat-flow curves and make it difficult to interpret the relationship between flow and habitat for this stream reach. Because maximum habitat (WUA) occurs at the upper limit of the flow model (275 cfs), the available habitat at the proposed minimum streamflows (2.2 to 15.5 cfs) is much lower than maximum (table 3-130) for rainbow trout adults, juveniles, and fry. Peak spawning habitat occurs at flows of about 50 to 60 cfs (figure 3-42), but is relatively flat across the range of model flows above 20 cfs. Available habitat for spawning is less than 50 percent in extreme critically dry to dry years during April to June. During below normal to wet years, available spawning habitat ranges from 49 to 80 percent (table 3-130). The available habitat for these life stages under the proposed minimum streamflows is consistently higher than the habitat provided by minimum streamflows under the existing license, and generally enhances conditions compared to median flows under estimated unregulated conditions.

In general, the HEA analysis indicates that available habitat (WUA) duration for adults is similar between the proposed minimum streamflows and historical flows under the existing license, but significantly greater than for estimated unregulated flows, particularly during critical low flow summer conditions (figure 3-43 provides an example for August and September). From December through June, the frequency curves for the existing license, proposed, and unregulated flows are very similar. In July, the habitat frequency curves for estimated unregulated conditions decline and diverge from the curves for

the existing license and proposed flow conditions; that is, there would be less habitat available under unregulated conditions. From August through November, the frequency curves for the three alternative flow conditions (existing license, proposed minimum streamflows, and estimated unregulated flows) remain relatively the same as July. Two study sites were measured in this stream reach, one close to the diversion dam (node 0) and one near the mid-point of the stream reach (node 1); similar to the stream reach of the North Fork of the North Fork American River between the Lake Valley reservoir dam and the Lake Valley canal diversion dam, there appear to be distinct differences between the two study locations relative to spawning habitat. During the early spawning season (March and April), the habitat frequency curves for all three flow conditions are very similar (figure 3-44) at the mid-reach study location. At the study location below the Lake Valley canal diversion dam in March, there is a sharp break in available habitat frequency under the existing license flows from near 80 percent of maximum about 35 to 40 percent of the time to 20 percent of maximum for about 50 to 55 percent of the time. In April, the break from 90 to 20 percent of maximum habitat occurs at about 60 to 70 percent of the time. Habitat under the proposed minimum streamflows exhibits a similar frequency distribution in March, although the available habitat decreases to about 40 percent of maximum. In April, the proposed minimum streamflows would result in a frequency distribution closer to estimated unregulated conditions. Given the stepped character of the curves for the existing license and proposed flows, this may reflect a sharp change in the area inundated and available to spawning rainbow trout.

Habitat flow analysis indicates that proposed minimum streamflows would provide maximum habitat (WUA) for foothill yellow-legged frog eggs in May and June during dry to wet years; during extreme critically dry and critically dry years only 46 percent of maximum habitat would be available (table 3-131). For tadpoles, nearly 100 percent of habitat would be available under the proposed minimum streamflows during below normal to wet years, 77 percent of maximum in dry years, 67 percent in critically dry years, and 46 percent in extreme critically dry years (table 3-131).

The minimum streamflows proposed by PG&E and the relicensing stakeholders for this stream reach of the North Fork of the North Fork American River would enhance existing habitat conditions for resident rainbow trout. Although proposed minimum streamflows would not achieve the target of 80 percent of maximum WUA, they would provide considerably more habitat for a greater duration than the existing license or estimated unregulated conditions.

Bear River Below Drum Canal Spillway Gate

PG&E proposes (DS-AQR, Part 6, *Flow Release to the Bear River Below Drum Canal at YB-137*) to install two 1-cfs fixed-release devices at the Drum canal spillway (waste) gate above gage YB-137; this measure is consistent with Forest Service recommendation 4 and California Fish and Wildlife recommendation 2.7. These valves would be used to release 1 cfs during extreme critically dry and critically dry years and 2 cfs in all other years to supplement flows to the Bear River upstream of the Drum afterbay.

Our Analysis

PG&E proposes to release minimum streamflows of 1 to 2 cfs, depending on water year type, to the upper Bear River from new release structures at the Drum canal spillway gate to supplement natural, unregulated flows in this stream reach. No minimum streamflow is required under the existing license at this location. PG&E does not divert water from this stream reach, but periodically releases flows from the Drum Canal through the stream reach for delivery to Drum afterbay. The release point from the Drum Canal to the Bear River is near the top of the Bear River watershed, and the estimated mean annual unregulated flow is about 2.2 cfs.

PG&E does not present a frequency analysis for historical flows in the Bear River above or immediately below the Drum canal spill channel. Under existing license conditions, median monthly discharge flows at this location (YB-137) are 0 cfs throughout the year except in May and June. Discharges at the Drum canal spillway gate have historically been restricted to February through July, with peak flows of 185 to 325 cfs during typical high flow spring period, March through June. Historical flows are generally 0 cfs from August through January.

Habitat-flow simulations for rainbow trout fry, juvenile, and adult life stages (figure 3-45) indicate that maximum habitat (WUA) occurs at about 2 cfs for fry, 5 cfs for juveniles, and 10 cfs for adults. California Fish and Wildlife (July 29, 2012) acknowledged that maximum habitat and the goal of 80 percent of maximum were inconsistent with the natural unregulated flow conditions that exist in this stream reach. The WUA curve for spawning habitat continues to increase to the upper limit of the model, 80 cfs (figure 3-45), but is relatively flat across the range of model flows above 40 cfs. Again, these estimated flows for optimum spawning are not consistent with the unregulated hydrology that exists in this stream reach. The available habitat for these life stages is consistently higher for proposed flows than the estimated unregulated flows that exist at the upper stream reaches of this watershed.

This analysis indicates that although the natural channel in this stream reach of the Bear River might appear to be capable of supporting a more robust population of rainbow trout, the low flows generated by natural runoff in this very small portion of the upper watershed of the Bear River do not support this potential. The minimum streamflows proposed at the Drum canal spillway would provide 59 percent of maximum WUA during extreme critically dry to dry years and 77 percent of maximum in below normal to wet years (table 3-132) for rainbow trout adults and would enhance conditions compared to natural unregulated conditions that exist in this stream reach.

The minimum streamflows proposed by PG&E and the relicensing stakeholders for this reach of the upper Bear River would enhance existing habitat conditions for resident rainbow trout above what is supported by the natural hydrology of the stream reach. There are no water diversions or withdrawals from this stream reach, and the existing resident rainbow trout population reflects the carrying capacity of the stream reach provided by the natural unregulated flows.

Bear River at Highway 20 Crossing, Between South Yuba Canal Inflow at Gage YB-139 and Gage YB-198

PG&E proposes to provide minimum streamflows of 5 cfs to 13 cfs in the Bear River at the Highway 20 crossing between the inflow from the South Yuba canal and gage YB-198 (table 3-133). Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

Our Analysis

Under estimated unregulated conditions in this stream reach of the Bear River, median monthly flows would be less than proposed minimum streamflows (table 3-133) except during March. Highest estimated unregulated median monthly flows (9 to 10 cfs) occur in April and May. Under the existing license, the required minimum streamflow in this stream reach is 5 cfs year round in all years. Historical median monthly flows under the existing license consistently exceed estimated unregulated flows by an order of magnitude. Minimum historical monthly flows (90 percent exceedance flow) and maximum historical monthly flows (10 percent exceedance flow) are also typically an order of magnitude higher than estimated unregulated flows. Minimum historical flows under the existing license are higher than proposed minimum streamflows from October through March and lower than proposed minimum flow from April through September. The proposed flows would generally ensure minimum streamflows that would be higher than unregulated conditions, but are lower than the historical flows that have persisted in

this stream reach under the existing license. It is likely that typical flow characteristics in this stream reach would be unchanged under the proposed minimum streamflows.

The study reach was divided into two stream sub-reaches: the upper meadow sub-reach and the lower Boardman sub-reach. Habitat-flow simulations for resident rainbow trout in the two stream sub-reaches (figure 3-46 and figure 3-47) indicate that maximum habitat occurs at about 10 cfs for juveniles and at about 15 cfs for adults. Maximum spawning habitat in the meadow stream reach occurs at about 25 to 30 cfs, but in the Boardman reach, spawning habitat is relatively constant from about 40 to 155 cfs. Given that estimated natural unregulated maximum flows during the spawning period do not exceed 21 cfs and historical median flows exceed 20 cfs only in May, this model prediction is probably not very indicative of actual habitat conditions. In the Meadow sub-reach, proposed minimum streamflows would provide greater than 80 percent of maximum habitat for spawning, juveniles, and adults, with maximum habitat available in July through September for juveniles and April through June for adults (table 3-134). In the Boardman sub-reach, proposed minimum streamflows would provide greater than 80 percent of maximum habitat for juveniles and adults, with 99 percent of maximum habitat available in April through September for juveniles and maximum habitat in April through June for adults (table 3-135).

In general, the HEA analysis indicates that available habitat (WUA) duration for adults is similar between the proposed minimum streamflows and historical flows under the existing license, but typically greater than for estimated unregulated flows, particularly during critical low flow summer and fall (June through January) conditions (figure 3-48 provides an example for August and September). Throughout the year, the frequency curves for existing license historical flows, proposed minimum flows, and estimated unregulated flows are very similar. During the early spawning season (March and April), the habitat frequency curves for all three alternative conditions are similar, but slightly lower for estimated unregulated conditions (figure 3-49) in the Boardman sub-reach. In the Meadow sub-reach, the proposed minimum streamflow and existing license flow frequency curves are stepped and cross under and over the estimated unregulated curve.

The minimum streamflows proposed by PG&E and the relicensing stakeholders for this stream reach of the Bear River upstream of Drum afterbay would enhance existing habitat conditions for resident rainbow trout, providing near maximum habitat for juveniles and adults throughout the year in all years. Spawning habitat would exceed the 80 percent target for the Meadow sub-reach. Results of habitat flow analysis for spawning habitat in the Boardman sub-reach suggests streamflows would produce WUAs that are generally higher than estimated unregulated flows could provide, but would appear to provide at least 50 percent of maximum habitat.

Alta Development

Canyon Creek Below Towle Canal Diversion Dam

PG&E proposes to provide minimum streamflows of 1 to 3 cfs, depending on month and water year type, in Canyon Creek downstream of the Towle canal diversion dam (table 3-136). Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

Our Analysis

Under estimated unregulated conditions in this stream reach of Canyon Creek, median monthly flows would be less than proposed minimum streamflows (table 3-136) from July through November in all years and June through November in below normal to wet years. Highest estimated unregulated median monthly flows (about 6 cfs) occur in March and April. Under the existing license, the minimum required streamflow in this stream reach is 1 cfs year round in all years. Historical median monthly flows

under the existing license are consistently less than estimated unregulated flows and generally less than or equal to proposed minimum streamflows. The proposed flows would generally ensure that minimum streamflows are higher than historical conditions.

Habitat-flow simulations for resident rainbow trout in the two stream sub-reaches (figure 3-50) indicate that maximum habitat occurs at about 8 cfs for juveniles, at about 10 cfs for adults, and at about 5 cfs for fry. Maximum spawning habitat in this stream reach occurs at about 15 cfs, but is relatively constant from about 8 to 28 cfs. Given that natural unregulated median flows during the spawning period do not exceed 6 cfs, this model prediction is probably not very indicative of the natural carrying capacity provided by estimated unregulated flows in this stream reach. Proposed minimum streamflows would provide 59 to 76 percent of maximum adult habitat in critically dry to above normal years and 85 percent during March to May in wet years (table 3-137). Proposed minimum streamflows would provide 73 to 86 percent of maximum juvenile habitat in extreme critically dry to above normal years and 92 percent during March to May in wet years (table 3-137).

In general, the HEA analysis indicates that available habitat (WUA) duration for adults is similar between the proposed minimum streamflows, historical flows under the existing license, and estimated unregulated flows, except in August and September when the frequency distribution for unregulated flows is considerably lower than under the existing license or proposed minimum streamflows (figure 3-51 provides an example for August and September). During the early spawning season (March and April), the habitat frequency curves for all three alternative flow conditions are similar.

Foothill yellow-legged frog was found twice in 2008 and once in 2009 at a site in the downstream portion of this stream reach. No evidence of foothill yellow-legged frog breeding was found. Canyon Creek is a relatively small stream, with moderate to high shading by the riparian canopy. Potential foothill yellow-legged frog breeding and rearing habitat is limited and associated with occasional shallow pools and edge water. PG&E developed a 1D foothill yellow-legged frog habitat versus flow relationship for this stream reach and found that WUA for both foothill yellow-legged frog egg mass and tadpole life stages was highest at the lowest modeled flow of 1 cfs. Available WUA for this stream reach under the proposed minimum streamflows exceeds 90 percent for foothill yellow-legged frog eggs and tadpoles from May through September (table 3-138).

The minimum streamflows proposed by PG&E and the relicensing stakeholders for this stream reach of Canyon Creek downstream of the Towle canal diversion dam would enhance existing habitat conditions for resident rainbow trout and foothill yellow-legged frog, providing near maximum habitat for juvenile and adult trout throughout the year in all years.

Little Bear River Below Alta Powerhouse Tailrace

PG&E proposes to provide minimum streamflows of 0.5 cfs to 4 cfs, depending on month and water year type, in the Little Bear River downstream from Alta powerhouse tailrace (table 3-139). Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

Our Analysis

PG&E used the CFR model to assess the relationship between flow and aquatic habitat at transects in run, riffle, and pool habitats at one study site in Little Bear River downstream of Alta powerhouse tailrace. The average wetted width at the study sites was less than 8 feet, and average depth was less than 0.6 feet. The range of study flows (0.3 to 3.02 cfs) and associated model flow range (0.25 to 7.55 cfs) capture the range of proposed minimum streamflows (0.5 to 4 cfs). Between 0.2 cfs,

0.5 cfs, 1 cfs, and 4 cfs, the wetted perimeter increases by about 18, 7, and 20 percent (figure 3-52), respectively.

Under the existing license, the minimum streamflows for this stream reach is 1 cfs measured below the Upper Boardman canal diversion dam. Historical median monthly flow under the existing license is 0.2 cfs from June through November, with highest median monthly flows in February and March (6 to 7 cfs). Minimum historical monthly flows (90 percent exceedance) are less than 1 cfs all year except in March. Maximum historical flows (17 to 29 cfs) occur from January through May. Under estimated unregulated conditions, median flows in the stream reach of Little Bear River below Alta powerhouse would be at or less than the proposed minimum flow during the months of July through November except in extreme critically dry years when estimated unregulated median flows would be greater than proposed minimum streamflows. The proposed flows would ensure minimum streamflows of at least 0.5 cfs throughout the year in extreme critically dry years and 1 cfs in critically dry years. The specified minimum streamflows in dry to wet years introduces a progressively stronger seasonal peak between February and May.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under the existing license conditions, and the flows would introduce some seasonal and inter-annual variability, depending on water year type. The range of flows in this stream reach is likely to remain similar to existing conditions.

Dutch Flat No. 1 Development

Bear River Below Drum Afterbay Dam

PG&E proposes to provide minimum streamflows of 10 to 16 cfs in the Bear River downstream of the Drum afterbay dam, depending on month and water year type (table 3-140). Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows. The minimum streamflow requirement under the existing license ranges from 5 to 10 cfs.

Our Analysis

Under estimated unregulated conditions in this stream reach of the Bear River, median monthly flows would be less than proposed minimum streamflows (table 3-140) from July through November in extreme critically dry and critically dry years and July through December in all other years. Highest estimated unregulated median monthly flows (31 to 55 cfs) occur in February to May. Historical median monthly flows under the existing license exceed unregulated flows from July through October. Minimum historical monthly flows (90 percent exceedance flow) are relatively constant throughout the year (5.1 to 5.6 cfs). The proposed action would ensure that minimum streamflows would be higher than historical conditions under the existing license in all years, but would be lower than estimated unregulated median flows during winter and spring (January to May). The proposed minimum streamflows would also introduce seasonal flow variability in all years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-53) indicate that maximum habitat for juveniles occurs at about 15 cfs and for adults at about 35 cfs. Maximum habitat for fry occurs at the low flow limit of the model (about 5 cfs), decreasing sharply to about 30 percent of maximum at about 30 cfs. Maximum spawning habitat in the stream reach is relatively constant from about 30 to 85 cfs. Proposed minimum streamflows would provide greater than 79 to 87 percent of maximum habitat for adults in dry to wet years and 73 to 87 percent of maximum in extreme critically dry and critically dry years (table 3-141). Proposed minimum streamflows would provide 97 to 100 percent of

maximum available habitat in all months and all years (table 3-141). About 70 to 73 percent of maximum spawning habitat would be available in dry to wet years and in April to May of extreme critically dry and

Between October and February, the adult habitat frequency curve for estimated unregulated conditions is higher than that for the proposed minimum streamflows; in March through June, the frequency curves for flows under the existing license, proposed minimum streamflows, and estimated unregulated flows are very similar. During the typical low flow period of the year in July through September, the proposed minimum streamflows and existing license flows provide higher habitat frequencies than the estimated unregulated condition (figure 3-54 provides an example for August and September). During the early spawning season (March and April), the habitat frequency curves for all three flow conditions are similar; estimated unregulated conditions are slightly higher than the proposed minimum streamflows would provide, and the historical flow frequency curve under the existing license is slightly lower than the other two flow conditions (figure 3-55). The minimum streamflows proposed by PG&E and the relicensing stakeholders for this stream reach of the Bear River downstream of Drum afterbay dam would enhance existing habitat conditions for resident rainbow trout, providing near maximum habitat for juveniles throughout the year in all years. The proposed flows would provide habitat near or above the 80 percent target for adult rainbow trout. Spawning habitat would be 70 to 73 percent of maximum available during the spawning season in most years.

Halsey Development

Bear River Diversion Dam And Bear River Canal

PG&E proposes (DS-AQR6, *Coordination of DS and YB Project Operations Regarding the YB Project Minimum Streamflows in the Bear River Below Rollins Reservoir at YB-196*) a measure to coordinate Drum-Spaulding Project operations at the Bear River canal diversion dam with Yuba-Bear Project operations at the Rollins Development to ensure compliance with minimum streamflow requirements for the downstream Bear River (at YB-196). This measure is the same as BLM condition 3, California Fish and Wildlife recommendation 2.3, and Forest Service 10(a) recommendation 2.

Our Analysis

NID proposes minimum streamflows for the Bear River downstream of the Rollins dam, which we discuss in detail later under the Yuba-Bear Project, Rollins Development; compliance with that condition would be measured at gage YB-196, which is located downstream of the Drum-Spaulding Project's Bear River canal diversion dam. Although NID might release adequate flows at Rollins dam to meet the compliance requirements at YB-196, the potential exists that PG&E could divert enough water to the Bear River canal such that releases downstream from the Bear River canal diversion dam would not be in compliance with proposed minimum streamflows. The coordination proposed by PG&E and the stakeholders would ensure that PG&E and NID coordinate the operations of both projects to remain in compliance with the minimum streamflows for the lower Bear River included in the new license.

Wise Development and Wise No. 2 Development

Dry Creek Below Halsey Afterbay Dam

PG&E proposes to provide minimum streamflows of 1 cfs in Dry Creek downstream of the Halsey afterbay dam at all times (table 3-142). Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows. Under the existing license, there is no minimum streamflow requirement for Dry Creek downstream of Halsey afterbay dam.

NMFS proposed year-round minimum streamflows of 1 cfs in Dry Creek below Halsey afterbay dam, which is consistent with the PG&E proposal, the Forest Service recommendation, and the California Fish and Wildlife recommendation.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in Dry Creek downstream of Halsey afterbay dam. The average wetted width at the study sites was less than 10 feet, and average depth was less than 0.8 foot. The model flow range (about 0.2 to 7.5 cfs) captures the proposed minimum streamflows (1 cfs). The breakpoint in the flow versus wetted perimeter curve (figure 3-56) used by the stakeholders as the target summer flow occurs at about 1 cfs. Between 0.2 cfs and 1 cfs, the wetted perimeter increases by about 40 percent.

Under the existing license, there are no minimum streamflows for this stream reach. PG&E does not present a flow frequency analysis for historical flows in Dry Creek below Halsey afterbay dam. Under estimated unregulated conditions, median flows in Dry Creek would be at or less than the proposed minimum flow during August through October. Median monthly unregulated flows are highest during March and April (6.1 to 6.5 cfs). There are no anadromous fish in the project-affected reaches of Dry Creek below Halsey afterbay dam.

The proposed flows would ensure minimum streamflows of at least 1 cfs throughout the year, including dry periods when this reach of Dry Creek has historically been dry. The proposed minimum streamflows for Dry Creek immediately below Halsey afterbay dam would ensure more aquatic habitat for resident species in this stream reach throughout the summer than under existing conditions. The range of flows in this stream reach is likely to improve and enhance aquatic habitat compared to existing license conditions; the range of peak spring flows in this stream reach is likely to remain similar to existing conditions.

Rock Creek Below Rock Creek Reservoir Dam

PG&E proposes to provide minimum streamflows of 1 to 3 cfs, depending on month and water year types, in Rock Creek downstream of the Rock Creek diversion dam (table 3-143). During extreme critically dry to below normal years, the minimum flow would be 1 cfs in all months except March when proposed flows would be 3 cfs; during above normal and wet years, minimum streamflows would be 2 to 3 cfs. Forest Service recommendation 1 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

NMFS also proposed year-round minimum streamflows of 1 cfs in Rock Creek downstream of the Rock Creek reservoir dam, which is consistent with the PG&E proposal, the Forest Service recommendation, and the California Fish and Wildlife recommendation.

Our Analysis

PG&E and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in Rock Creek downstream of Rock Creek reservoir dam. The average wetted width at the study sites was less than 10 feet, and average depth was less than 1 foot. The model flow range (about 0.4 to 9.2 cfs) captures the range of proposed minimum streamflows (1 to 3 cfs). The breakpoint in the flow versus wetted perimeter curve (figure 3-57) occurs at about 3 cfs; the application of the breakpoint was used by PG&E and the relicensing stakeholders to establish a summer low-flow standard. Between 0.4 cfs and 3 cfs, the wetted perimeter increases by about 32 percent.

Under the existing license, there are no required minimum streamflows for this stream reach. Historical median monthly flow under the existing license is 0.2 cfs year round except in January and July when flow is 0.1 and 0.3 cfs, respectively. Minimum historical monthly flows (90 percent exceedance) are about 0 cfs all year except March through April (0.1 cfs). Maximum historical monthly flows range from 8 to 35 cfs with no particular seasonal peak. Under estimated unregulated conditions, median flows in this reach of Rock Creek would be at or less than the proposed minimum flow during July through December in extreme critically dry to below normal years and during June through January in above normal and wet years. The proposed flows would ensure minimum streamflows of at least 1 cfs throughout the year in extreme critically dry to below normal years and 2 to 3 cfs in above normal and wet years. There are no anadromous fish in the project-affected reaches of Rock Creek below Rock Creek reservoir.

The proposed minimum streamflows would ensure more aquatic habitat for resident aquatic species in this stream reach throughout the summer than under the existing license conditions, and the flows would introduce some inter-annual variability, depending on water year type. The range of flows in this stream reach is likely to improve and enhance aquatic habitat compared to existing conditions.

Auburn Ravine Below Wise No. 1 And No. 2 Powerhouses

To support resident rainbow trout, PG&E proposes minimum streamflows of 2 to 18 cfs, depending on month and water year type, in Auburn Ravine at the release point (RM 27.6) from South canal below the Wise and Wise No. 2 Development (table 3-144). Forest Service (recommendation 1) and California Fish and Wildlife (recommendation 2.2) recommend the same monthly minimum streamflows. NMFS also recommends year-round minimum streamflows of 6 cfs immediately downstream of the South canal release point to support anadromous salmonids in Auburn Ravine.

PG&E proposes that during an outage of the Bear River, Upper or Lower Wise, or South canals, the minimum flow at the compliance point in Auburn Ravine would be the natural flow in Auburn Ravine measured at an upstream location to be agreed on by the relicensing stakeholders. California Fish and Wildlife recommends that during a canal outage the minimum flow be the specified minimum streamflow (table 3-144) for the appropriate month and water year or 5 cfs, whichever is less.

Our Analysis

Flows in Auburn Ravine are highly regulated by the many non-project water deliveries and diversions that occur downstream of PG&E's release from South canal (*Auburn Ravine Streamflows-Supplement to the License Application*, April 2012; Technical Memorandum 3-13, *Western Placer County Streams*). The downstream geographic extent of direct effects of PG&E's release of flow from South Canal to Auburn Ravine is limited to the upper 1 mile of Auburn Ravine (FERC, 2009a). Direct effects of the Drum Spaulding project do not extend below the confluence of PCWA's Auburn Tunnel with Auburn Ravine, because of the relatively large non-project consumptive water deliveries made at Auburn Tunnel. Those combined non-project water deliveries are typically considerably higher than the relatively small minimum streamflow releases made by PG&E at South Canal. The cumulative effects on flows of the project and of these numerous non-project diversions and deliveries of water in Auburn Ravine, including from Auburn Tunnel, are discussed in more detail in section 3.3.2.3, *Cumulative Effects*, and section 3.3.4, *Threatened and Endangered Species*. The relicensing stakeholders recognized the complexity of these interacting water uses in downstream reaches and focused on providing flows in Auburn Ravine to enhance aquatic habitat in the area immediately downstream of PG&E's release point from South canal.

The factors influencing flow in the stream reaches of Auburn Ravine (*Auburn Ravine Streamflows-Supplement to the Final License Application*, April 2012; Technical Memorandum 3-13,

Western Placer County Streams) downstream of PG&E's flow release from South canal (figure 3-58) are complex and interact to affect aquatic habitat and species. The upper reach of Auburn Ravine is about 1 mile long and is directly influenced by PG&E's release from South canal (RM 27.46), which is less than 0.1 mile below an overflow to Auburn Ravine at RM 27.5 from the PCWA pump facilities from Auburn Tunnel. Proposed minimum streamflow releases from South canal range from 4 to 18 cfs depending on month and water year, but under the existing license are typically 40 to 80 cfs during winter hydropower operations and can increase up to 150 cfs between April and November to meet NID water delivery demands. North Ravine enters at RM 27.3 and carries water deliveries (3 to 15 cfs) from NID's non-project Combie III canal into the upper reach with an additional major discharge of 1 to 9 cfs from the City of Auburn wastewater treatment plant (RM 27). Ophir Cataract at RM 26.6, located just upstream of Auburn tunnel, is a natural barrier to upstream migration of Central Valley steelhead and is the upstream extent of steelhead critical habitat.

The middle stream reach of Auburn Ravine begins below PCWA's Auburn Tunnel (RM 26.4), which typically releases 50 cfs and up to 150 cfs between April and November into Auburn Ravine from the North Fork American River, and extends about 2.6 miles downstream to NID's non-project Auburn Ravine 1 diversion dam (RM 23.8). Within this middle stream reach there is a PCWA delivery of about 25 cfs from South canal via an unnamed tributary which enters Auburn Ravine at RM 26.1. PG&E identified several small private diversions and withdrawals from this reach of Auburn Ravine.

The non-project Auburn Ravine 1 diversion dam (RM 23.8) is the first large water diversion downstream from the PG&E release from South canal to Auburn Ravine. This 11-ft high dam is a barrier to upstream steelhead migration during all but the most infrequent hydrological conditions. Although designated steelhead critical habitat extends upstream to RM 26.6, it is unlikely that steelhead occupy this 2.8 mile reach because of the migration barrier at Auburn Ravine 1 diversion dam (PG&E 2010, 2012a). This is discussed in more detail in section 3.3.4, *Threatened and Endangered Species*.

Downstream from the Auburn Ravine 1 diversion dam (figure 3-59), numerous diversions by NID, PCWA, and other riparian water rights holders affect the flows in the lower stream reach of Auburn Ravine (*Auburn Ravine Streamflows-Supplement to the License Application*, April 2012; Technical Memorandum 3-13, *Western Placer County Streams*). In addition, PCWA makes withdrawals at several locations along South canal to meet their water delivery requirements, releasing this water into tributaries that enter lower Auburn Ravine farther downstream from the Auburn Ravine 1 diversion dam. On average, PG&E's releases from South canal at RM 27.5 historically account for about 27 percent of flows in this reach of Auburn Ravine under the existing license.

Under the existing license, PG&E is not required to provide minimum releases to Auburn Ravine from the South canal. Auburn Ravine does, however, have flow under most conditions, because the combined hydraulic capacity of the discharge of the Wise powerhouses exceeds the hydraulic capacity of South canal. This excess canal water is normally released via a spill gate in South canal to Auburn Ravine a short distance downstream of the Wise and Wise No. 2 Development. These water spills into Auburn Ravine from South canal are also made to meet water delivery commitments to NID and PCWA. The primary use of water delivery to NID and PCWA is for agriculture and irrigation customers between spring and early fall. Water withdrawals from Auburn Ravine between mid-October and the following spring are minimal and primarily by small private riparian property owners.

Historical median monthly flow at PG&E's release from South canal to the upper stream reach of Auburn Ravine under the existing license is 34.5 to 171.0 cfs from May through November and 239.2 to 300.2 cfs in December through April. Annual planned canal outages for maintenance result in relatively low median flows in November. Minimum historical monthly flows (90 percent exceedance) are 10.0 to 15.0 cfs in April through December, 1.2 to 2.3 cfs in October and November, and 20.8 to 46.9 cfs January

through March. Maximum historical monthly flows range from 143.0 to 342.1 cfs with no particular seasonal peak. PG&E did not provide estimated unregulated flow data for this reach of Auburn Ravine. The proposed minimum flows would ensure minimum streamflows of at least 2 to 4 cfs throughout the year in extreme critically dry to critically dry years, 4 to 6 cfs in dry and below normal years, and 4 to 18 cfs in above normal and wet years.

Habitat-flow simulations using the PHABSIM model for resident rainbow trout in the upper stream reach (figure 3-60) indicate that maximum habitat occurs at about 8 cfs for juveniles and at about 10 cfs for adults. Maximum habitat for fry occurs near the low flow limit of the model (about 3 cfs), decreasing sharply to about 40 percent of maximum at about 25 cfs and continuing to decrease variably to 18 percent of maximum at 175 cfs. Spawning habitat in the upper stream reach peaks at about 28 cfs; at least 80 percent of habitat would be available between 10 and 70 cfs. Proposed minimum streamflows would provide 68 to 85 percent of maximum habitat for adults in extreme critically dry and critically dry years depending on month and 85 to 100 percent of maximum in dry to wet years (table 3-145). Proposed minimum streamflows would provide 76 percent of maximum habitat for juveniles in extreme critically dry and critically dry years depending on month and 91 to 98 percent of maximum in dry to wet years (table 3-145). In April, available spawning habitat would increase from 29 percent in extreme critically dry years to 95 percent in wet years (table 3-145). In May and June, available spawning habitat would increase from 29 percent in extreme critically dry and critically dry years to 54 percent in all wetter years. Based on these habitat analyses PG&E, the Forest Service, and California Fish and Wildlife agreed on a schedule of minimum streamflows in Auburn Ravine for the focused purpose of enhancing the habitat for resident rainbow trout immediately downstream from South Canal in the upper stream reach of Auburn Ravine when there is water available in South canal.

In Auburn Ravine, minimum streamflows proposed by PG&E and the relicensing stakeholders are equal to or higher than NMFS' recommended flows during March and April in dry and wetter years. During other months in dry and wetter years PG&E proposed minimum streamflows of 4 cfs to support resident rainbow trout in the upper stream reach of Auburn Ravine compared to 6 cfs recommended by NMFS to support Central Valley steelhead in middle and lower stream reaches of Auburn Ravine. Project augmented flows proposed by PG&E to benefit resident species are more appropriate in the upper stream reach of Auburn Ravine than flows targeting anadromous salmonids that are unable to access this stream reach due to natural and man-made barriers at Ophir Cataract (RM 26.6) and Auburn Ravine 1 diversion dam (RM 23.8). Based on PG&E's habitat-flow analysis, the 2 cfs difference between PG&E's proposed 4 cfs flows and NMFS' recommended 6 cfs flows would result in only about a 1 percent increase in habitat for resident rainbow trout adults, juveniles, and spawning and about a 6 percent decrease in fry habitat. Given the numerous non-project discharges and withdrawals that occur throughout Auburn Ravine, it is unlikely that the 2 cfs difference between the PG&E proposal and NMFS recommendation during drier years could generate any meaningful additional enhancement in habitat for anadromous salmonids in the upper and middle stream reaches of Auburn Ravine and, in particular, in lower Auburn Ravine below Auburn Ravine 1 diversion dam. PG&E and California Fish and Wildlife differ on the minimum flow to be released during canal outages affecting the South canal release point. Planned outages for annual maintenance of the canals have historically been scheduled for late October and early November after the agricultural demand for water declines. When the Bear River canal, upper Wise canal, or lower Wise canal is taken out of service no water enters South canal from the Wise powerhouses and PG&E has no additional storage or facilities from which to provide water to augment natural baseflows in Auburn Ravine. Because there is no source of water controlled by PG&E from which to release water to upper Auburn Ravine during a canal outage, the minimum streamflow in this reach of Auburn Ravine would be the natural baseflow in Auburn Ravine at the time of the outage. PG&E's proposed measure is appropriate during a canal outage, since they do not divert water from Auburn Ravine, operation of the Wise and Wise No.2 Development does not affect flows in Auburn

Ravine, and releases from South canal when the canals are operating augment the natural flow to enhance aquatic habitat.

The proposed minimum streamflows would ensure more aquatic habitat in the upper stream reach of Auburn Ravine below PG&E's South canal discharge throughout the summer than under the existing license conditions, and the flows would introduce some inter-annual variability, depending on water year type. The range of flows in this stream reach is likely to improve and enhance aquatic habitat compared to existing license conditions. Additional discharges from the City of Auburn wastewater treatment plant to the upper stream reach of Auburn Ravine and PCWA's Auburn Tunnel to the middle stream reach of Auburn Ravine further augment the natural base flow, cumulatively affecting aquatic habitat in the middle and lower stream reaches of Auburn Ravine in conjunction with numerous other withdrawals and discharges in those reaches.

Newcastle Development

Mormon Ravine Below Newcastle Powerhouse Header Box

PG&E proposes to provide minimum streamflows of 5 cfs in Mormon Ravine downstream of the Newcastle Development at all times in all years (table 3-146). If a critically dry year is preceded by a critically dry or extreme critically dry year, the minimum would be reduced to 1 cfs. Forest Service (10(a) recommendation 1) and California Fish and Wildlife (recommendation 2.2) recommend the same monthly minimum streamflows proposed by PG&E.

Reclamation recommends a minimum streamflow regime (10(a) recommendation A.1.e) for Mormon Ravine downstream of the Newcastle Development powerhouse of 50 to 200 cfs between January and May during extreme critically dry, critically dry, and dry year (table 3-147); no minimum is specified for May through December. Reclamation's objective for making this recommendation is to protect and augment the cold water pool in Folsom Lake which Reclamation relies on to comply with downstream maximum summer water temperature limits in the lower American River, consistent with their obligations under the Biological Opinion for the Central Valley Project and State Water Project. The Reclamation recommendation is particularly targeted at maintaining higher flows of cold water to Folsom Lake from Mormon Ravine during periods in the spring when the Newcastle Development is not operating. Reclamation recommends that following an unplanned outage of less than 2 weeks at the Newcastle powerhouse during January to May, PG&E make up the deficit water volume resulting from the outage by making additional water releases during the subsequent 4 weeks.

Our Analysis

In general, Reclamation's recommended minimum streamflows during winter and spring (January through May) to protect the Folsom Lake cold water pool are slightly lower than the historical monthly average (1987-2008) flow entering Folsom Lake via Mormon Ravine during normal operation of the Newcastle powerhouse under the existing license. However, Reclamation's minimum streamflow recommendations are nearly two orders of magnitude higher than the minimum streamflows proposed by PG&E and recommended by the Forest Service and California Fish and Wildlife specifically for the benefit of aquatic habitat in Mormon Ravine.

The Drum-Spaulding Project has always been operated first to meet its historical consumptive water supply obligations, which are tied to the historical firm delivery capability of the project in dry years. Through diversions from South canal and Auburn Ravine, PCWA uses all PG&E contract water (100,400 acre-feet per water year) in years with low spring runoff. Excess water in the system has been used by PG&E for non-consumptive generation of power and discharged to the American River watershed since 1931 when Newcastle powerhouse was constructed. The Newcastle powerhouse

discharges to Mormon Ravine about 0.3 mile above the high water elevation of Folsom Lake which is managed by Reclamation. Under the existing license, the minimum streamflow requirement for Mormon Ravine is 5 cfs with no minimum streamflow during an outage of South canal. PG&E does not divert any water from Mormon Ravine.

Increased water demand to meet minimum streamflows and other environmental flow measures in upstream affected reaches of the Drum-Spaulding Project could reduce the amount of excess water that reaches Newcastle powerhouse on Mormon Ravine under the new license. During winter and spring water delivery demand for agriculture and irrigation are typically minimal, so most water delivered to South canal above minimum streamflow releases to Auburn Ravine (see previous section) would be used for power generation and be released to Mormon Ravine. Flows discharged to Mormon Ravine as a result of Newcastle powerhouse operations during winter and spring of dry and wetter water years are likely to remain similar to historical flows under the existing license, that is, similar to minimum streamflows recommended by Reclamation. During extreme critically dry and critically dry water years, it is possible that monthly average flows reaching Newcastle powerhouse in the South canal would be slightly less than under the existing license, once other project-related upstream minimum streamflows have been met.

During outages of the Bear River canal, Upper Wise canal, Lower Wise canal, or South canal, water would not be available for discharge to meet minimum streamflows in Mormon Ravine once South canal drains and Newcastle power house shuts down. Because water delivered to western Placer County through this canal system is primarily used to meet water delivery obligations of NID and PCWA, planned canal outages for annual maintenance are typically scheduled for after the agriculture and irrigation season demand declines in early October. Planned outages in late October and early November would not affect the cold water pool in Folsom Lake which is why Reclamation has not proposed minimum flows in this time period. Canal outages during January through May are unusual, and are usually the result of an emergency shutdown or identification of an urgent maintenance requirement that cannot be delayed until the scheduled annual maintenance outage. PG&E would be unable to meet Reclamation's minimum flows during January through May, if one of these infrequent unplanned or emergency outages occurred. The relatively small difference between the historical monthly average flows under the existing license and Reclamation's recommended flows for the same seasonal period, indicates that there is little excess flow in the system at Mormon Ravine that could be used to further increase flow following an outage to make up the outage-related deficit. In addition, the hydraulic capacity constraints of South canal also limit the amount of water that PG&E is able to deliver to the Newcastle Development to make up the flow deficit that would result from a canal outage of any more than a few days during winter and spring; during December through March flows at the Newcastle powerhouse are frequently near the hydraulic capacity of the canal and powerhouse.

PCWA commented that Reclamation's Mormon Ravine minimum streamflow recommendation should be rejected because it would directly affect water rights PCWA relies on to meet current and future water demands of customers in its service area. As discussed previously, the primary purpose of this canal system is to divert water from the Yuba River and Bear River watersheds to Auburn and Mormon Ravines to meet water delivery obligations to downstream agricultural, municipal, and commercial customers. PCWA exercises its water rights by diverting water from the Bear River canal, Upper and Lower Wise canals, and, in particular, from South canal between the Wise and Newcastle powerhouses. PCWA points out that under license conditions proposed by PG&E, NID, the Forest Service, and BLM, much of this historically excess runoff in the Yuba and Bear River watersheds would be captured in the future to comply with environmental measures (e.g., minimum streamflows, spill cessation, and supplemental flows for water temperature management) within those watersheds. PCWA is concerned that as a result of these proposed environmental measures, the volume of water available for diversion from the Bear River at the Bear River canal diversion dam would be significantly reduced under future license conditions, making the remaining volume inadequate to still meet both PCWA consumptive water

rights and water necessary to meet Reclamation's minimum streamflows into Mormon Ravine and Folsom Lake via the Newcastle Development. PCWA cites legal precedent¹¹ to demonstrate that Reclamation can make no claim against PG&E or PCWA water rights associated with transfers from the Yuba and Bear Rivers to meet flow and temperature requirements of the Central Valley Project Biological Opinion for the lower American River. PCWA explains that their water rights and the canal delivery system dates to the early 1900s prior to when the system was retrofitted for hydroelectric generation. Until 1931 all water discharged from the Wise powerhouses entered Auburn Ravine; however, to reduce riparian property damage along Auburn Ravine that resulted from the higher than natural flows, South canal and the Newcastle Development were constructed to reduce flows in Auburn Ravine and provide an alternative release location for those flows.

PG&E's proposed minimum streamflows at upstream project-affected stream reaches are balanced by a reduction in flow releases and generation at the Newcastle Development, the most downstream development in the Drum-Spaulding Project. Flows used for generation at Newcastle are the surplus of interbasin transfers under legal water rights and agreements used to meet water delivery to PCWA and NID customers. The minimum streamflows proposed by PG&E for the Newcastle Development would ensure adequate aquatic habitat in Mormon Ravine in the summer except during canal outages. While generation and discharges from the Newcastle powerhouse are likely to decrease during late spring and summer compared to the existing license, the range of minimum streamflows in Mormon Ravine would improve at other times (e.g., late summer and fall). Historically under the existing license, median monthly discharge peaks (125 to 280 cfs) at Newcastle between December and May, the period of peak runoff in the upstream watersheds of the Drum-Spaulding and Yuba Bear Projects and the period during which Reclamation has proposed minimum streamflows of 50 to 200 cfs. The purpose of Reclamation's recommended minimum streamflows is to maintain the cold water pool of Folsom Lake, and is not designed to protect or enhance habitat or water quality in the short projected-affected stream reach of Mormon Ravine below the Newcastle Development. Minimum streamflows proposed by PG&E and normal operation of the Newcastle Development would protect aquatic resources in Mormon Ravine and outside of an unplanned or emergency canal outage would be adequate to continue to support the cold water pool in Folsom Lake. Depending on the duration of unplanned and emergency outages during winter and spring, Reclamation could experience some deficit in coldwater inflow from the Drum-Spaulding Project. However, the magnitude and frequency of such outages and deficits is not likely to be different than experienced under the existing license.

Yuba-Bear Project

Flow in a stream reach affects the quality and quantity of habitat available to aquatic organisms through its effect on a range of aquatic habitat features including, but not limited to, water depth, inundation, wetted perimeter, cover, and velocity. Where streamflow is diverted for power generation, water supply, or other uses, the quantity of water and natural seasonal and inter-annual variability are typically reduced. To improve habitat conditions for resident aquatic organisms, NID proposes a monthly minimum streamflow regime (YB-AQR1, Part 2) for 15 project-affected stream reaches conditioned on six water year types (section 3.3.2.2.1, *Water Year Type*). NID's proposed minimum streamflows are generally consistent with minimum streamflows specified in Forest Service condition 29 and BLM condition 4 and recommended in California Fish and Wildlife recommendation 2.2 for the respective stream reaches. NID and the relicensing stakeholders anticipate that the proposed minimum streamflow regime would preserve or enhance aquatic habitat compared to conditions with minimum streamflows (where they have been specified) under the existing license (table 3-148). Compared to estimated unregulated flow conditions, the proposed flows would frequently provide more habitat for a greater

¹¹ *Stevens v. Oakdale Irrigation District* (1939) 13 Cal.2d 343, 348-353.

percentage of the time during summer and fall, when unregulated flows in many high elevation headwater stream reaches would otherwise be less than the proposed flows; proposed flows would provide similar or less habitat than unregulated conditions during winter and spring, when natural unregulated runoff would be higher than the proposed flows.

The proposed minimum streamflows and estimated aquatic habitat changes for stream reaches affected by the Yuba-Bear Project are discussed below by development in general upstream to downstream order. Two additional project-affected stream reaches associated with the Chicago Park Development are also discussed in this section: Bear River below the Chicago Park powerhouse where powerhouse outages can temporarily reduce minimum streamflows and Steephollow Creek where occasional spills from the Chicago Park flume can affect aquatic habitat.

Bowman Development

Middle Yuba River below Jackson Meadows reservoir dam

NID's proposes minimum streamflows of 11 to 120 cfs, depending on month and water year type, in the Middle Yuba River downstream of Jackson Meadows reservoir dam (table 3-149). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows. The minimum streamflow under the existing license is 5 cfs year round.

Our Analysis

Under estimated unregulated conditions in this reach of the Middle Yuba River, median monthly flows would generally be less than proposed minimum streamflows (table 3-149) from July through November in dry to wet years and from August through November in extreme critically dry and critically dry years. Highest unregulated median monthly flows (about 110 to 356 cfs) occur in April to June. Historical median monthly flows under the existing license range from an annual low of 9 to 11 cfs in November to February to high flows from 99 to 145 cfs between May and October. Minimum historical monthly flows (90 percent exceedance flow) are 5 to 9 cfs under the existing license. Highest historical median flows under the existing license (144.0 to 145.5 cfs) occur in September and October when estimated unregulated flows would typically be at the annual low (5 cfs). The proposed minimum streamflows would be higher than estimated unregulated median flows during late summer and fall (August to November), but lower during winter and spring. The proposed minimum streamflows would shift seasonal flow variability to mimic better the natural seasonal hydrograph.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-61) indicate that maximum habitat occurs at about 20 cfs for juveniles and at about 35 cfs for adults. Maximum habitat for fry occurs at the low flow limit of the model (about 5 cfs), decreasing sharply to about 33 percent of maximum at about 140 cfs and then increasing steadily to about 87 percent at the upper model limit of 460 cfs. Spawning habitat in the stream reach increases from a minimum at the lower model boundary of 5 cfs to a maximum at about 120 cfs and then gradually decreases to about 62 percent of maximum as flow increases to the upper model boundary of about 460 cfs. Proposed minimum streamflows would provide greater than 80 to 100 percent of maximum habitat for adults in all years (table 3-150). Proposed minimum streamflows would provide 75 to 100 percent of maximum available habitat for juveniles in all months and all years (table 3-150). Highest juvenile habitat availability during fall and winter would occur during above normal years; highest juvenile habitat during spring would occur during extreme critically dry and critically dry years. The higher flows proposed during dry and wetter years would reduce available habitat for juvenile. Proposed flows would provide the highest amount of spawning habitat in May during all years (79 to 100 percent), depending on water year type. Spawning habitat in April and June would range from 33 to 100 percent, depending on water year type (table 3-150).

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar or higher than both historical flows under the existing license and estimated unregulated flows (figure 3-62) provides an example for August and September). Habitat duration under estimated unregulated conditions is predicted to be better than under proposed flows only in April.

The minimum streamflows proposed by NID and the relicensing stakeholders for the Middle Yuba River downstream of Jackson Meadows reservoir dam would enhance existing habitat conditions for resident rainbow trout. The proposed schedule of minimum streamflows would create inter-annual variability and seasonal variation mimicking variability typical of a natural, unregulated hydrograph. Proposed flows would provide in excess of the 80 percent of maximum habitat target for juveniles and adults throughout the year in all years. Even during extreme critically dry years spawning habitat would be near the 80 percent target for a portion of the spawning season.

Middle Yuba River Below Milton Diversion Dam

NID's proposes to provide minimum streamflows of 4 to 70 cfs, depending on month and water year type, in the Middle Yuba River downstream of Milton diversion dam (table 3-151). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows. The minimum streamflow under the existing license is 3 cfs.

NID proposes (YB-AQR1, Part 4) and the relicensing stakeholders recommend some flexibility for determining winter minimum streamflows for Middle Yuba River based on near-term meteorological conditions (table 3-151). In the event that California DWR Bulletin 120 indicates that the recent year was a wet year, but precipitation records from July 1 through late fall/winter indicate that the upcoming year could be a dry year, a small 5-cfs decrease in the minimum streamflow is proposed for November to January in Middle Yuba River below Milton diversion dam. In February, minimum streamflows would revert to the appropriate proposed monthly minimum based on the California DWR Bulletin 120 water year designation.

Under section 10(j), NMFS recommends minimum streamflows of 10 to 200 cfs to be implemented in the future (table 3-152) to support reintroduction of spring-run Chinook salmon and Central Valley steelhead to the upper Yuba River upstream of Englebright dam, including Middle Yuba River downstream of Milton diversion dam. The flows are proposed regardless of water year type, except for extreme critically dry years when consultation would be required among the Commission, NMFS, PG&E, the U.S. Army Corps of Engineers, and other stakeholders involved in the anadromous salmonid reintroduction program.

YCWA recommends that the new licenses for the Yuba-Bear and Drum-Spaulding Projects include a requirement to reopen the licenses to address the potential for higher minimum streamflows in the new license for the Yuba River Project (FERC Project No. 2246). YCWA specifically requests that the Commission reserve its authority in the Yuba-Bear and Drum-Spaulding licenses to require NID and PG&E to mitigate or avoid cumulative impacts of their projects, including diversions, in the Yuba River Basin, as such issues may arise in the relicensing of the Yuba River Project, or in other proceedings related to Yuba River flows.

Our Analysis

Under estimated unregulated conditions in this stream reach of the Middle Yuba River, median monthly flows would generally be less than proposed minimum streamflows (table 3-151) in September and October in critically dry and dry years, and July through November in below normal to wet years; proposed flows in extreme critically dry years would be less than estimated median monthly unregulated

flows. Highest estimated unregulated median monthly flows (about 115 to 378 cfs) occur in April to June. Historical median monthly flows under the existing license are consistently 4 cfs or less, year round. Minimum historical monthly flows (90 percent exceedance flow) are 3.4 cfs or less. The proposed minimum streamflows would ensure higher minimum streamflows than under existing license conditions in all years, but would be lower than estimated unregulated median flows during winter and spring (December to June). The proposed minimum streamflows would also introduce seasonal flow variability in all years, which does not exist under the existing license. NID's proposal to reduce minimum streamflows during winters leading into potentially dry years would still be considerably higher than the 3 cfs minimum streamflow under the existing license during winter in Middle Yuba River below Milton diversion dam.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-63) indicate that maximum habitat occurs at about 45 cfs for juveniles and at about 65 cfs for adults. Maximum habitat for fry occurs at the low flow limit of the model (about 15 cfs), decreasing sharply to about 50 percent of maximum at about 100 cfs and then increasing steadily to about 80 percent at about 600 cfs. Maximum spawning habitat in the stream reach is relatively constant from about 50 to 1,100 cfs with a slight decrease between 300 and 600 cfs. Proposed minimum streamflows would provide greater than 40 to 100 percent of maximum habitat for adults, depending on month and water year type (table 3-153). During extreme critically dry, critically dry, and dry years, available habitat would be less than 50 percent year round; during below normal to wet years, habitat for adults would exceed 80 percent of maximum in spring and early summer (March to July). Juvenile habitat availability under proposed flows would range from 56 to 100 percent, with the highest availability in spring (April to June) ranging from 65 percent in extreme critically dry years to 100 percent in wet years. In below normal to wet years, juvenile habitat would be 77 to 100 percent of maximum year round. Proposed flows would provide the highest amount of spawning habitat in May during all years (27 to 76 percent, depending on water year type). Spawning habitat in April and June would range from 27 to 74 percent, depending on water year type (table 3-153).

NMFS recommended minimum streamflows are associated with a plan for reintroducing spring-run Chinook salmon and Central Valley steelhead to the upper Yuba River upstream of Englebright dam, including Middle Yuba River below Milton diversion dam was included in the *Biological Opinion for Continued Operation and Maintenance of Englebright Dam and Reservoir, Daguerre Point Dam, and Recreational Facilities on and Around Englebright Reservoir* (NMFS, 2012). NMFS expects these reintroduction efforts may occur sometime during any new license term of the Drum-Spaulding and Yuba Bear Projects; the status of the proposal for reintroduction of these species is discussed in more detail in section 3.3.4, *Threatened and Endangered Species*. The timing of the reintroduction is highly uncertain, but NMFS recommends these minimum streamflows for future implementation when reintroduction does occur. The NMFS recommended flows to support this reintroduction in Middle Yuba River below Milton diversion dam are generally higher than those proposed by NID, Forest Service 4(e) conditions, and recommended by California Fish and Wildlife; however, during below normal to wet years, NID's proposed flows are higher in January to March. NID's proposed flows are also higher in April to June during above normal and wet years. Given the uncertain status and progress toward reintroduction of anadromous salmonids in this watershed, establishment and implementation of the flows recommended by NMFS is premature.

Relatively high numbers of egg masses and tadpoles of foothill yellow-legged frog were identified during field surveys of the stream reach below Milton diversion dam. Habitat flow analysis for foothill yellow-legged frog indicates that proposed minimum streamflows from May through September would provide in excess of 90 percent of maximum habitat for these early life stages in most water years (table 3-154). During May in above normal and wet years, higher flows would reduce habitat for foothill yellow-legged frog eggs to 81 and 77 percent of maximum, respectively. The NMFS flow proposal to support anadromous salmonids would increase flows in the Middle Yuba River below the Milton

diversion dam from 10 cfs at the end of May to 200 cfs on June 1 during peak foothill yellow-legged frog egg occurrence. The increase in flow from 30 cfs in dry years to 70 cfs in wet years results in a decrease in frog egg habitat from 99 percent of maximum to 77 percent of maximum (table 3-154). An increase in flow of the magnitude proposed by NMFS would cause a major loss of egg habitat and is likely to quickly flush existing egg masses downstream.

YCWA's reopener recommendation is associated with the potential effect of minimum streamflows and water transfers by the Yuba-Bear Project in Middle Yuba River and the Drum-Spaulding Project in South Yuba River on minimum flow releases stipulated in the Yuba River Accord for the Yuba River Project (FERC Project No. 2246), which is involved in a separate relicensing process at this time. The Yuba River Accord minimum flows were negotiated to provide the optimum benefits from available water supplies to lower Yuba River fisheries. YCWA says it would continue the Yuba River Accord minimum flows in the new license for the Yuba River Project. YCWA indicates that it agreed to meet the Yuba River Accord flows with the understanding that upstream, out-of-basin flows at the Yuba-Bear and Drum-Spaulding Projects would continue at their present rates. YCWA states that if required minimum streamflows from the Yuba River Project increase under its new license, then NID and PG&E should be required to make up a proportionate share of the increase through reduced water transfers by the Yuba-Bear and Drum-Spaulding Projects, since all three projects cumulatively affect the lower Yuba River.

PCWA disagrees with YCWA's recommendation for a reopener in the Yuba-Bear and Drum-Spaulding project licenses to address future minimum flow measures that potentially could be implemented for the lower Yuba River in the Yuba River Projects' new license. PCWA points out that they hold senior water rights and receive water transferred by NID and PG&E from the Middle and South Yuba Rivers to meet water demands of their customers. PCWA details the history of water rights of the respective project licensees and water purveyors in the upper and lower Yuba River. PCWA contends that the premise of YCWA's request is faulty and fails to represent clearly the nature of legally established water rights in the various basins and agreements established in the Yuba River Accord for the lower Yuba River. PCWA states that the YCWA proposal would use the relicensing process to curtail the senior water rights held by NID and PG&E to benefit the junior water rights YCWA holds, thus short-circuiting California's established water right processes that have precedence over the Commission's relicensing process.

The request by YCWA for a measure to reopen the Yuba-Bear Project license to address potential changes in minimum flow conditions in the future Yuba River Project license is not an environmental matter appropriate for discussion in our environmental analysis.

The minimum streamflows proposed by NID and the relicensing stakeholders for the Middle Yuba River downstream of Milton diversion dam would enhance existing habitat conditions for resident rainbow trout, but frequently do not achieve the target of 80 percent of maximum available habitat. Adult habitat would meet or exceed this target during the spring and early summer and juvenile habitat year round during below normal or wetter years. Spawning habitat reaches 76 percent in May during wetter years. Foothill yellow-legged frog egg and tadpoles were abundant in the stream reach from Milton diversion dam downstream to Wolf Creek. The proposed minimum streamflows would provide in excess of 90 percent of maximum habitat for these life stages during most of their period of occurrence in this stream reach in most years. High flows proposed by NMFS when anadromous fish reintroduction occurs are likely to adversely affect development of foothill yellow-legged frog eggs in this stream reach. The schedule of minimum streamflows proposed by NID would create inter-annual variability and seasonal variation mimicking variability typical of an unregulated hydrograph. NID's proposed schedule of minimum streamflows for the Middle Yuba River downstream of Milton diversion dam balances an improvement in aquatic habitat for rainbow trout, near maximum habitat for foothill yellow-legged frog, water rights and obligations for consumptive water deliveries, and project power generation. The request

by YCWA for a condition to reopen the Yuba-Bear Project license to address potential changes in minimum flow conditions in the future Yuba River Project license is a procedural matter that would be addressed in the license order. Each project is evaluated on its own merits, and the standard reopener article would address any future need to revisit license flow conditions if the facts warrant.

Wilson Creek Below Wilson Creek Diversion Dam

NID's proposes to provide minimum streamflows of 0.25 cfs or natural flow, whichever is less, in Wilson Creek downstream of Wilson Creek diversion dam (table 3-155). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows. There is no minimum streamflow under the existing license.

Our Analysis

NID and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in Wilson Creek downstream of Wilson Creek diversion dam. The average wetted width at the study sites was less than 10 feet, and average depth was less than 1 foot. The model flow range (about 0.02 to 6.75 cfs) captures the proposed minimum flow, 0.25 cfs. The breakpoint in the flow versus wetted perimeter curve (figure 3-64), the target used by the relicensing stakeholders to set summer flow, occurs at about 2.5 cfs. Between 0.01 cfs and 0.25 cfs (the proposed minimum flow), the wetted perimeter increases by about 10 percent.

Under the existing license, there are no minimum streamflows for this stream reach. No data are available for historical flows under the existing license or to estimate unregulated flow conditions.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing license conditions when most flow is diverted from Wilson Creek to the Milton Bowman diversion conduit. The range of flows in this stream reach is likely to improve and enhance aquatic habitat compared to existing license conditions.

Jackson Creek Below Jackson Lake Dam

NID's proposes to provide minimum streamflows of 0.5 to 3 cfs, depending on month and water year type, in Jackson Creek downstream of Jackson Lake dam (table 3-156). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows. The minimum streamflow under the existing license is 0.75 cfs.

Our Analysis

NID and the relicensing stakeholders used the CFR model to assess the relationship between flow and aquatic habitat at transects in Jackson Creek downstream of Jackson Lake dam. The average wetted width at the study sites was less than 10 feet, and average depth was less than 1 foot. The model flow range (about 0.75 to 7.43 cfs) captures the range of proposed minimum streamflows (0.5 to 3.0 cfs). The breakpoint in the flow versus wetted perimeter curve (figure 3-65) occurs at about 2.5 cfs; the application of the breakpoint was used by NID and the relicensing stakeholders as a target for summer minimum streamflows. Between 0.75 cfs and 3 cfs (the proposed minimum flow in June of wet years), the wetted perimeter increases by about 12 percent.

The minimum flow specified under the existing license is 0.75 cfs year round in all years; the historical minimum streamflows (90 percent exceedance) have been about 0.9 cfs year round. Under the existing license, the median monthly flow is 1.2 to 1.6 cfs year round; maximum flows are about 1.7 to 2 cfs year round. Under estimated unregulated conditions, the median monthly flow would be less than

the proposed minimum flow from July through November in extreme critically dry and critically dry years, and from July through December in all other years. Highest estimated median monthly unregulated flows occur in April and May (6.1 to 9.7 cfs). Proposed minimum streamflows in all but wet years are generally less than the historical median flow under the existing license. It is likely with the distribution of flows proposed by NID that flow conditions would be similar to those under the existing license; however, the proposed minimum streamflows would ensure that streamflows would be no less than 0.5 cfs in extreme critically dry and critically dry years and at least 0.75 cfs year round in all other years.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing conditions in above normal and wet years and similar habitat in dry and below normal years. The range of proposed flows would provide seasonal and inter-annual variability in this stream reach and would be likely to improve and enhance aquatic habitat compared to existing conditions during wetter years.

Canyon Creek Below French Lake Dam

NID proposes to provide minimum streamflows of 5 to 18 cfs, depending on month and water year type, in Canyon Creek downstream of French Lake dam (table 3-157). Forest Service condition 29 specifics and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Under estimated unregulated conditions in the reach of Canyon Creek below French Lake dam, median monthly flows would generally be less than proposed minimum streamflows (table 3-157) from July through December in all years, through January in dry and below normal years, through February during above normal years, and through March during above normal and wet years. Highest estimated unregulated median monthly flows (about 17 to 69 cfs) occur in March to June. The required minimum streamflow under the existing license is 2.5 cfs year round during all years. Historical records under the existing license demonstrate very low variability in flow through this stream reach. Historical median monthly flows range from 2.9 to 3.2 cfs under the existing license. Minimum historical monthly flows range from 2.7 to 2.9 cfs, and maximum historical monthly flows range from 3.1 to 3.2 cfs under the existing license. NID proposes minimum streamflows that would be higher than estimated unregulated median flows during late summer and fall (August to November), but lower during winter and spring. The proposed minimum streamflows would provide seasonal flow variability during wetter years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-66) indicate that maximum habitat occurs at about 10 cfs for juveniles and at about 18 cfs for adults. Maximum habitat for fry occurs near the low flow limit of the model (about 4 cfs), decreasing sharply to about 36 percent of maximum at about 35 cfs and then variably decreasing to about 30 percent at about 130 cfs. Maximum spawning habitat in the stream reach is relatively constant from about 10 cfs to 160 cfs at the upper model limit. Proposed minimum streamflows would provide at least 78 percent of maximum habitat for adults in below normal to wet years (table 3-158) and 73 percent in extreme critically dry and critically dry years. Proposed minimum streamflows would provide 88 to 100 percent of maximum available juvenile habitat in all months and all years (table 3-158). Highest juvenile habitat availability (100 percent) during fall and winter would occur during above normal years. Proposed flows would provide at least 80 percent of maximum spawning habitat in dry to wet years. Spawning habitat in extreme critically dry and critically dry years would be about 80 percent of maximum (table 3-158).

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar to or higher than both historical flows under the

existing license and estimated unregulated flows (figure 3-67 provides an example for August and September).

The minimum streamflows proposed by NID and the relicensing stakeholders for Canyon Creek downstream of French Lake dam would enhance existing habitat conditions for resident rainbow trout in most years. The proposed schedule of minimum streamflows would create inter-annual variability and improve seasonal variation mimicking variability typical of an unregulated hydrograph. Proposed flows would provide in excess of the 80 percent of maximum habitat target for juveniles and adults throughout the year in dry and wetter years. Even during extreme critically dry and critically dry years, spawning habitat would be near at least 70 percent.

Canyon Creek Below Faucherie Lake Dam

NID's proposes to provide minimum streamflows of 5 to 18 cfs, depending on month and water year type, in Canyon Creek downstream of Faucherie Lake dam (table 3-159). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Under estimated unregulated conditions in the stream reach of Canyon Creek below Faucherie Lake dam, median monthly flows would generally be less than proposed minimum streamflows (table 3-159) from July through November in all years, through December in below normal years, through January in above normal, and through February during wet years. Highest estimated unregulated median monthly flows (about 34 to 129 cfs) occur in March to June. There is no required minimum flow under the existing license. Historical records demonstrate very low variability in flow in this stream reach under the existing license; minimum historical monthly flows range from 2.7 to 2.9 cfs (except 1.3 cfs in September) under the existing license. Historical median monthly flows range from 2.9 to 3.0 cfs, and maximum historical monthly flows range from 3.1 to 3.3 cfs under the existing license. The proposed action would provide minimum streamflows that would be higher than estimated unregulated median flows during late summer and fall (August to November), but lower during winter and spring. The proposed minimum streamflows would provide seasonal flow variability during wetter years. No minimum streamflow is required in this stream reach under the existing license.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-68) indicate that maximum habitat occurs at about 10 cfs for juveniles and at about 18 cfs for adults. Maximum habitat for fry occurs near the low flow limit of the model (about 5 cfs), decreasing sharply to about 35 percent of maximum at about 90 cfs and then variably increasing to about 60 percent at 225 cfs, the upper limit of the model. Maximum spawning habitat in the stream reach occurs at about 30 cfs and gradually decreases to about 50 percent of maximum at the upper model limit. Proposed minimum streamflows would provide at least 89 percent of maximum habitat for adults in all years (table 3-160). Proposed minimum streamflows would provide 94 to 100 percent of maximum available juvenile habitat in all months and all years (table 3-160); higher proposed minimum streamflows during summer and fall in above normal and wet years would reduce available habitat from 100 percent of maximum provided in below normal years. Proposed flows would provide greater than 80 percent of maximum spawning habitat in above normal and wet years, but 47 percent in extreme critically dry and critically dry years, and 53 and 70 percent in dry and below normal years, respectively (table 3-160).

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar or higher than both historical flows under the existing license and estimated unregulated flows (figure 3-69 provides an example for August and September).

The minimum streamflows proposed by NID and the relicensing stakeholders for Canyon Creek downstream of Faucherie Lake dam would enhance existing habitat conditions for resident rainbow trout in most years. The proposed schedule of minimum streamflows would create inter-annual variability and improve seasonal variation, mimicking variability typical of an unregulated hydrograph. Proposed flows would provide in excess of the 80 percent of maximum habitat target for juveniles and adults throughout the year in all years. During below normal to wet years, spawning habitat would be at least 70 percent.

Canyon Creek Below Sawmill Lake Dam

NID's proposes to provide minimum streamflows of 5 to 18 cfs, depending on month and water year type, in Canyon Creek downstream of Sawmill Lake dam (table 3-161). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Under estimated unregulated conditions in the reach of Canyon Creek below Sawmill Lake dam, median monthly flows would generally be less than proposed minimum streamflows (table 3-161) from July through November in all years and from July through December in wet years. Highest estimated unregulated median monthly flows (about 61 to 231 cfs) occur in March to June. Historical records demonstrate very low variability in flow through this stream reach under the existing license. Historical median monthly flows range from 3.4 to 4.2 cfs and minimum historical monthly flows range from 2.8 to 3.0 cfs under the existing license. Maximum historical monthly flows range from 6.1 to 57.0 cfs; however, highest maximum flows under the existing license occur in late summer through early winter with lows in the spring, the opposite of the seasonal pattern observed under estimated unregulated conditions. The proposed action would provide minimum streamflows that would be higher than estimated unregulated median flows during late summer and fall (August to November), but lower during winter and spring. The proposed minimum streamflows would provide inter-annual variability, but no seasonal flow variability. No minimum streamflow is required in this stream reach under the existing license.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-70) indicate that maximum habitat occurs at about 35 cfs for juveniles and at about 55 cfs for adults. Maximum habitat for fry occurs near the low flow limit of the model (about 10 cfs), decreasing sharply to about 42 percent of maximum at about 55 cfs and then variably decreasing to about 34 percent at about 280 cfs. Maximum spawning habitat in this stream reach peaks at 50 cfs and is relatively constant from about 35 cfs to 280 cfs at the upper model limit. Proposed minimum streamflows would provide 80 percent of maximum habitat for adults in wet years (table 3-162), 73 percent in above normal years, 59 percent in below normal years, and 42 percent in extreme critically dry and critically dry years. Proposed minimum streamflows would provide at least 81 percent of maximum available juvenile habitat in below normal and wetter years (table 3-162), 70 percent in dry years, and 65 percent in extreme critically dry and critically dry years. Spawning habitat in extreme critically dry and critically dry years would be about 28 percent of maximum (table 3-162), increasing to 62 percent in wet years.

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar to or higher than both historical flows under the existing license and estimated unregulated flows (figure 3-71 provides an example for August and September). Between January and June, the exceedance curves for all three flow conditions (proposed, historical under the existing license, and estimated unregulated) are very similar, with the proposed flow conditions usually slightly higher; from July through December, the proposed flows would provide significantly higher WUAs more frequently than under estimated unregulated conditions or the existing license.

The minimum streamflows proposed by NID and the relicensing stakeholders for Canyon Creek downstream of Sawmill Lake dam would enhance existing habitat conditions for resident rainbow trout in most years compared to existing license conditions. The proposed schedule of minimum streamflows would create inter-annual variability. Proposed flows would provide in excess of the 80 percent of maximum habitat target for juveniles throughout the year in below normal and wetter years.

Canyon Creek Below Bowman-Spaulding Diversion Dam

NID proposes to provide minimum streamflows of 4 to 60 cfs, depending on month and water year type, in Canyon Creek downstream of Bowman-Spaulding diversion dam (table 3-163). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

NID (YB-AQR1, Part 4) and the relicensing stakeholders propose and recommend some flexibility for determining winter minimum streamflows for Canyon Creek based on near-term meteorological conditions. In the event that California DWR Bulletin 120 indicates that the recent year was a wet year, but precipitation records from July 1 through late fall/winter indicate that the upcoming year could be a dry year, a small (5 cfs) decrease in the minimum streamflow is proposed during January in Canyon Creek below Bowman-Spaulding diversion dam. In February, minimum streamflows would revert to the appropriate monthly minimum based on the California DWR Bulletin 120 water year designation.

To support reintroduction of anadromous salmonids in the upper Yuba River above Englebright dam, NMFS recommends under section 10(j) flows of 15 to 75 cfs in all years (table 3-164) for this reach of Canyon Creek.

Our Analysis

Under unregulated conditions in the reach of Canyon Creek below the Bowman-Spaulding diversion dam, median monthly flows would generally be less than proposed minimum streamflows (table 3-163) from August through October in all years, July through October in critically dry years, and July through November in dry and wetter years. Highest unregulated median monthly flows (about 66 to 380 cfs) occur in February to June. The minimum flow required for this reach of Canyon Creek under the existing license is 3 cfs between April 1 and October 31 and 2 cfs between November 1 and March 31. Historical records demonstrate very low variability in flow in this stream reach. Historical median monthly flows range from 4.1 to 6.3 cfs; minimum historical monthly flows range from 2.1 to 3.3 cfs; and maximum historical monthly flows range from 6.6 to 270 cfs. Historical monthly maximum flows are similar to the unregulated median flows. The proposed action would provide minimum streamflows that would be higher than unregulated median flows during late summer and fall, but lower during winter and spring. The proposed minimum streamflows would provide inter-annual and seasonal flow variability during all years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-72) indicate that maximum habitat occurs at about 25 cfs for juveniles and at about 80 cfs for adults. Maximum habitat for fry occurs near the low flow limit of the model (less than 10 cfs), decreasing sharply to about 35 percent of maximum at about 90 cfs and then variably increasing to about 36 percent at 530 cfs, the upper limit of the model. Maximum spawning habitat in the reach occurs at about 40 cfs and gradually decreases to about 32 percent of maximum at the upper model limit. Proposed minimum streamflows would provide at least 79 percent of maximum habitat for adults between February and September in below normal and wetter years (table 3-165) and 66 percent during fall and early winter; available adult habitat in extreme critically dry, critically dry, and dry years would equal about 40, 50, and 66 percent of maximum, respectively. Proposed minimum streamflows would provide at least 89 percent of maximum available

juvenile habitat year round in dry or wetter years (table 3-165); during critically dry years, habitat would be 75 percent of maximum in fall and winter and at least 89 percent in spring and summer. Habitat for juveniles during extreme critically dry years would be 64 to 75 percent of maximum. Proposed flows would generally provide greater than 80 percent of maximum spawning habitat in below normal and wetter years, but 28 to 39 percent in extreme critically dry years, 59 to 75 percent in critically dry years, and 75 to 86 percent in dry years (table 3-165). The proposed reduced winter flows in anticipation of an upcoming dry season would still be considerably higher than the 2 cfs minimum in Canyon Creek under the existing license.

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar or higher than both historical flows under the existing license and estimated unregulated flows (figure 3-73 provides an example for August and September). Between January and June, the exceedance curves for all three flow conditions (proposed, existing license, and estimated unregulated) are very similar with the proposed flow conditions usually slightly higher; from July through December, the proposed flows would provide significantly higher WUAs more frequently than under estimated unregulated conditions or under the existing license.

Foothill yellow-legged frog egg masses were found during relicensing surveys at a location about 9.3 miles downstream of Bowman-Spaulding diversion dam. The habitat modeling for foothill yellow-legged frog indicates that the proposed minimum streamflows would provide 83 to 100 percent of the maximum available habitat for foothill yellow-legged frog eggs and tadpoles under extreme critically dry to below normal years (table 3-166). As proposed minimum streamflows increase with wetter years, the available foothill yellow-legged frog habitat decreases to 69 to 84 percent in above normal years and 64 to 83 percent in wet years.

A plan for reintroducing spring-run Chinook salmon and Central Valley steelhead to the upper Yuba River upstream of Englebright dam, including Middle Yuba River below Milton diversion dam, was included in the *Biological Opinion for Continued Operation and Maintenance of Englebright Dam and Reservoir, Daguerre Point Dam, and Recreational Facilities on and Around Englebright Reservoir* (NMFS, 2012). NMFS expects these reintroduction efforts may occur sometime during any new license term of the Drum-Spaulding and Yuba Bear Projects; the status of the proposal for reintroduction of these species is discussed in more detail in section 3.3.4, *Threatened and Endangered Species*. The timing of the reintroduction is highly uncertain, but NMFS has proposed these flows for future use when reintroduction does occur. The NMFS recommended flows to support this reintroduction in South Yuba River below Lake Spaulding dam are generally higher than those proposed by NID, PG&E, Forest Service 4(e) conditions, and recommended by California Fish and Wildlife.

The increased minimum flows recommended by NMFS to support future reintroduction of spring-run Chinook salmon and Central Valley steelhead would likely reduce critical habitat for foothill yellow-legged frog. As NID's proposed flows in May increase from 15 cfs during critically dry years to 60 cfs in wet years, the predicted percent of maximum habitat available for foothill yellow-legged frog decreases from 96 percent to 77 percent (table 3-166); NMFS' recommended flow (75 cfs) during peak foothill yellow-legged frog egg occurrence in May and June would further reduce available habitat. NMFS' recommended 30-cfs flows in July through September when tadpoles would be present are equal to or higher than NID's recommended flows during all water years except July in wet years. Consequently, while the proposed NID flows would provide tadpole habitat 89 percent of maximum or greater in extreme critically dry years to below normal years and 79 percent of maximum habitat in August and September of above normal and wet years, the NMFS flow would provide only 64 percent of habitat during all three months regardless of water year (table 3-166).

The minimum streamflows proposed by NID and the relicensing stakeholders for Canyon Creek downstream of the Bowman-Spaulding diversion dam would enhance existing habitat conditions for resident rainbow trout in most water years compared to existing conditions. Optimum flow conditions for resident rainbow trout and flows recommended by NMFS are not necessarily beneficial to foothill yellow-legged frog. The schedule of minimum streamflows proposed by NID and the relicensing stakeholders establishes a good balance between the flow requirements for these two species providing near maximum habitat availability for foothill yellow-legged frog during drier years while meeting the 80 percent target for rainbow trout during wetter years. The proposed schedule of minimum streamflows would create inter-annual variability and improve seasonal variation, mimicking variability typical of an unregulated hydrograph. The minimum streamflows proposed by NMFS for all years are likely to reduce available habitat for early life stages of foothill yellow-legged frog in Canyon Creek below Bowman-Spaulding diversion dam. Given the uncertain status and progress toward reintroduction of anadromous salmonids in this watershed, establishment and implementation of the flows recommended by NMFS is premature.

Dutch Flat No. 2 Development

Texas Creek Below Texas Creek Diversion Dam

NID proposes to provide minimum streamflows of 0.6 to 3 cfs, depending on water year type, in Texas Creek downstream of the Texas Creek diversion dam at the Bowman-Spaulding conduit (table 3-167). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

NID and the relicensing stakeholders used both the DFA method and CFR model to assess the relationship between flow and aquatic habitat at transects in Texas Creek below the Texas Creek diversion dam at the Bowman-Spaulding conduit. The average wetted width at the study sites was less than 10 feet, and average depth was less than 1 foot. The model flow range (about 0.36 to 30.68 cfs) captures the range of proposed minimum streamflows (0.6 to 3.0 cfs). The breakpoints in the flow versus wetted perimeter curve (figure 3-74) occur at about 1 cfs and 3 cfs; the application of the breakpoint was used by NID and the relicensing stakeholders to establish a summer low-flow target. Between 1 cfs and 3 cfs (the proposed minimum streamflow year round in above normal and wet years), the wetted perimeter increases by about 15 percent.

During the DFA/CFR field study, California Fish and Wildlife staff noted at the low calibration flow (0.90 cfs) that a small amount of good refuge habitat existed in this stream reach. Deep pools were observed in the upper stream reach and connectivity was established between habitat types at this flow. At the lowest flow, California Fish and Wildlife staff observed that all flow remained subsurface through the large cobble field at the confluence of Texas Creek with Canyon Creek, and there was no stream connectivity from Texas Creek to Canyon Creek. At the middle study flow, California Fish and Wildlife staff noted that stream connectivity was established with Canyon Creek. California Fish and Wildlife concluded that a range of flows between 1 cfs and 5 cfs would be sufficient to maintain fish in good condition in this stream reach. The effects of these spill events from the Bowman-Spaulding conduit on erosion and plans for erosion control and restoration of damaged stream reaches are discussed in detail in sections 3.3.1.2.1, *Slope Stability and Erosion*, and 3.3.1.2.2, *Habitat Restoration*. While the resulting aquatic resource habitat associated with the minimum streamflows proposed by NID and the stakeholders does not meet the optimal criteria, other measures for this stream reach (i.e., erosion mitigation, section 3.3.1.2.1, *Slope Stability and Erosion*) would be expected to improve habitat conditions for aquatic resources.

Historical flow data were not presented for this stream reach, but the stream is dry for much of the year under existing license conditions. Under estimated unregulated conditions, the median monthly flow would be less than the proposed minimum flow from July through October in extreme critically dry to dry years and from July through November in below normal to wet years. Highest estimated median monthly unregulated flows occur in April and May (51 to 70 cfs). It is likely that the distribution of flows under the proposed flow schedule would be similar to those under the existing license; however, the proposed minimum streamflows would ensure that flows would be no less than 0.6 cfs in extreme critically dry years and increase to 3 cfs in above normal and wet years.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing conditions, particularly during below normal and wetter years. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing conditions and would provide inter-annual variability in flows through this stream reach. No minimum streamflow is specified for this stream reach under the existing license.

Clear Creek Below Bowman-Spaulding Conduit

NID proposes to provide minimum streamflows of 1 to 6 cfs, depending on month and water year type, in Clear Creek below the Bowman-Spaulding conduit (table 3-168). Forest Service condition 29 specifics and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-75) indicate that the amount of habitat for juveniles and adults increases gradually over the modeled range of flow to the maximum flow of about 37 cfs; the curves for both life stages break to become more asymptotic at about 3 to 5 cfs. Available habitat for fry peaks at less than 5 cfs and then increases to the maximum near the upper flow limit of the model (37 cfs). Maximum spawning habitat in the stream reach occurs at about 37 cfs, with an asymptotic break at about 10 to 15 cfs. Proposed minimum streamflows would generally provide about 47 percent of maximum habitat (at 1 cfs) for adults in extreme critically dry to below normal years (table 3-169) and 59 to 79 percent (at 2 to 6 cfs) in above normal and wet years. Proposed minimum streamflows would generally provide about 55 percent of maximum habitat for adults in extreme critically dry to below normal years (table 3-169) and 67 to 81 percent in above normal and wet years. Proposed flows would generally provide less than 30 percent of maximum spawning habitat except in May and June of above normal and wet years, when available spawning habitat would be 41 to 64 percent of maximum (table 3-169).

There is no minimum flow requirement in this stream reach under the existing license, and the stream reach is typically dry for much of the year. NID opens the manual dump gate off the Bowman-Spaulding conduit and releases excess water into Clear Creek during winter when the Bowman-Spaulding canal is near capacity. There is evidence of substantial erosion likely due to these winter and other spill events from the Bowman-Spaulding conduit. The effects of these spill events on erosion and plans for erosion control and restoration of damaged stream reaches are discussed in detail in sections 3.3.1.2.1, *Slope Stability and Erosion*, and 3.3.1.2.2, *Habitat Restoration*. Historical flow data under the existing license were not presented for this stream reach, but the stream is dry for much of the year under existing conditions as most water is diverted to the Bowman-Spaulding conduit. Under estimated unregulated conditions, the median monthly flow would be less than the proposed minimum flow from July through November in below normal and drier years and from July through December in above normal and wet years. Highest estimated median monthly unregulated flows occur in April and May (13 to 18 cfs). It is likely that the distribution of flows under the proposed flow schedule would be similar to those under the existing license; however, the proposed minimum streamflows would ensure that flows would be no less

than 1 cfs in extreme critically dry to dry years and increase to 2 to 6 cfs minimum streamflows in above normal and wet years.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing conditions, particularly during below normal and wetter years. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide inter-annual variability in flows through this stream reach. While the resulting aquatic resource habitat associated with the minimum streamflows proposed by NID and the relicensing stakeholders does not meet their optimal criteria, other measures for this stream reach (i.e., erosion mitigation, section 3.3.1.2, *Habitat Restoration*) would be expected to further improve habitat conditions for the aquatic resources.

Fall Creek Below Fall Creek Diversion Dam

NID proposes to provide minimum streamflows of 1 to 20 cfs, depending on month and water year type, in Fall Creek below the Fall Creek diversion dam at the Bowman-Spaulling conduit (table 3-170).

Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends minimum streamflows (table 3-171) for Fall Creek below the diversion dam at the Bowman-Spaulling conduit that are generally higher, particularly from April through June, than those that NID proposes. In providing alternatives to the Forest Service condition, NID appears to indicate that it is willing to operate the Fall Creek diversion under the Forest Service minimum flow schedule with the caveat that during outages of the Bowman-Spaulling conduit, flow in Fall Creek below the conduit would equal flow in Fall Creek above the Fall Creek diversion.

Our Analysis

There is no minimum flow requirement in this stream reach under the existing license. Historical flow data under the existing license were not presented for this stream reach, but the stream reach is generally dry for most of the year. NID opens the manual dump gate off the Bowman-Spaulling conduit and releases excess water through Clear Creek during winter when flows in the Bowman-Spaulling conduit are near capacity. There is evidence of substantial erosion in the Fall Creek channel below the Bowman-Spaulling conduit likely due to these winter and other spill events from the Bowman-Spaulling conduit. The effects of these spill events on erosion and plans for erosion control and restoration of damaged stream reaches are discussed in detail in sections 3.3.1.2.1, *Slope Stability and Erosion*, and 3.3.1.2.2, *Habitat Restoration*. Under estimated unregulated conditions, the median monthly flow would be less than the Forest Service's specified minimum flow from July through October in extreme critically dry and critically dry years and from July through November in dry and wetter years. Highest estimated median monthly unregulated flows occur in April and May (56 to 77 cfs). Estimated unregulated maximum flows occur in April to June (105 to 156 cfs). Except in April, May, and June, proposed minimum streamflows range from 2 cfs in extreme critically dry, critically dry, and dry years to 4 to 10 cfs in below normal, above normal, and wet years. In order to mitigate for trout entrained into the Bowman-Spaulling conduit at this location, NID and the relicensing stakeholders agreed to increase flows in April (10 to 20 cfs), May (12.5 to 30 cfs), and June (4 to 25 cfs) when water is available to enhance spawning opportunities in Fall Creek below the conduit. The proposed minimum streamflows would ensure that flows would be no less than 2 cfs in extreme critically dry to critically dry years and increase to at least 6 cfs in above normal and wet years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-76) indicate that the amount of habitat for juveniles peaks at about 4 cfs and for adults at about 8 cfs. Habitat for these two life stages decreases to about 80 to 87 percent of maximum at about 50 cfs, then increases gradually to

about 89 percent at the upper model limit of 165 cfs. Available habitat for fry peaks at about 1 cfs, decreases to about 42 percent of maximum at about 32 cfs, and then increases to a second peak of 60 percent of maximum at 70 cfs. Maximum spawning habitat in the stream reach occurs at about 25 to 30 cfs, with a decline to about 46 percent at the upper model limit (165 cfs). Proposed minimum streamflows would generally provide about 47 percent of maximum habitat for adults in extreme critically dry to below normal years (table 3-172) and 59 to 79 percent (at 2 to 6 cfs) in above normal and wet years. Proposed minimum streamflows would provide at least 80 percent of maximum habitat for adults in dry and wetter years (table 3-172) and 63 percent in extreme critically dry and critically dry years. Proposed flows would generally provide 15 to 46 percent of maximum spawning habitat in July of all years (table 3-172).

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing license conditions, particularly during below normal and wetter years. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide inter-annual and seasonal variability in flows through this stream reach. While the resulting aquatic resource habitat associated with the minimum streamflows proposed by NID and the relicensing stakeholders does not meet their preferred optimal criteria (80 percent of maximum habitat), other proposed measures for this reach (i.e., control and mitigation of channel erosion damage associated with spills from the Bowman-Spaulling conduit, section 3.3.1.2, *Habitat Restoration*) would be expected to further improve habitat conditions for the aquatic resources.

Trap Creek Below Bowman-Spaulling Conduit

NID proposes to provide minimum streamflows of 0.25 to 3 cfs, depending on water year type, in Trap Creek downstream of the Bowman-Spaulling conduit (table 3-173). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

NID and the relicensing stakeholders used both the DFA method and CFR model to assess the relationship between flow and aquatic habitat at transects in Trap Creek below the Bowman-Spaulling conduit. The average wetted width at the study sites was less than 8 feet, and average depth was less than 1 foot. The model flow range (about 0.15 to 7.63 cfs) captures the range of proposed minimum streamflows (0.25 to 3.0 cfs). No clear breakpoint is apparent in the flow versus wetted perimeter curve (figure 3-77); as a result, the breakpoint could not be used by NID and the relicensing stakeholders as a target for determining summer minimum flows as for other stream reaches. Between 0.25 cfs and 3 cfs, the wetted perimeter increases by about 20 percent.

During the DFA/CFR field study, California Fish and Wildlife staff noted (July 29, 2012) that connectivity through the observable stream reach was established at the low study flow (0.37 cfs), but side margin habitat was poorly inundated. In addition, California Fish and Wildlife staff noted significant erosion in the upper part of the stream reach, most likely associated with spills from the Bowman-Spaulling conduit. California Fish and Wildlife determined that a flow equivalent to 30 to 40 percent of the mean annual flow throughout the summer would provide fair to good habitat. This is equivalent to a flow of between 0.79 to 1.1 cfs. Based on its analysis and field observations, California Fish and Wildlife determined that a range of flows between 0.25 cfs and 10 cfs (bank full) would be sufficient to maintain fish in good condition in this stream reach.

No minimum streamflow is specified for this stream reach under the existing license. Historical flow data under the existing license were not presented for this stream reach, but the stream is dry for

much of the year under existing conditions. Under estimated unregulated conditions, the median monthly flow would be less than the proposed minimum flow from July through November in extreme critically dry to dry years, from June through November in below normal years, from June through December in above normal years, and from June through January in wet years. Highest estimated median monthly unregulated flows occur in April and May (5 to 7 cfs). It is likely that the distribution of flows under the proposed flow schedule would be similar to that under the existing license; however, the proposed minimum streamflows would ensure that streamflows would be no less than 0.25 cfs in extreme critically dry years, and increase to 1.5 to 3 cfs minimum flows in above normal and wet years.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing license conditions, particularly during below normal and wetter years. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide inter-annual variability in flows through this stream reach. The effects of these spill events on erosion and plans for erosion control and restoration of damaged stream reaches are discussed in detail in sections 3.3.1.2.1, *Slope Stability and Erosion*. Other proposed measures for this stream reach (i.e., control and mitigation of channel erosion damage associated with spills from the Bowman-Spaulding conduit, section 3.3.1.2, *Habitat Restoration*) would be expected to further improve habitat conditions for the aquatic resources.

Rucker Creek Below Bowman-Spaulding Conduit

NID proposes to provide minimum streamflows of 0.3 to 3 cfs, depending on water year type, in Rucker Creek downstream of the Bowman-Spaulding conduit (table 3-174). Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.2 recommends the same monthly minimum streamflows.

Our Analysis

No minimum streamflow is specified for this stream reach under the existing license. Historical flow data under the existing license were not presented for this stream reach, but the stream is dry for much of the year under existing conditions. Under estimated unregulated conditions, the median monthly flow would be less than the proposed minimum flow from July through October in extreme critically dry to dry years, and from July through November in below normal to wet years. Highest estimated median monthly unregulated flows occur in April and May (16 to 21 cfs). Minimum estimated monthly unregulated flows are less than 1 cfs between June and January and the highest maximum monthly unregulated flows occur in March through June (26 to 43 cfs). It is likely that the distribution of flows under the proposed flow schedule would be similar to those under the existing license; however, the proposed minimum streamflows would ensure that flows would be no less than 0.3 cfs in extreme critically dry and critically dry years and would increase to 2 to 3 cfs in above normal and wet years.

NID and the relicensing stakeholders used both DFA method and CFR model to assess the relationship between flow and aquatic habitat at transects in Rucker Creek below the Bowman-Spaulding conduit. The average wetted width at the study sites was less than 15 feet, and average depth was less than 1.5 feet. The model flow range (about 0.5 to 21 cfs) does not completely capture the range of proposed minimum streamflows (0.3 to 3.0 cfs). The breakpoints in the flow versus wetted perimeter curve (figure 3-78) occur at about 2.5 cfs; the application of the breakpoint was used by NID and the relicensing stakeholders as a target for minimum summer flows. Between 0.5 cfs and 2.5 cfs, the wetted perimeter increases by almost 60 percent.

During the DFA/CFR field study, California Fish and Wildlife staff noted (July 29, 2012) at the low calibration flow (0.73 cfs) that good connectivity was established through the large cobble substrate. California Fish and Wildlife concluded that the collaboratively developed minimum streamflows would

substantially improve conditions for the aquatic biota and provide connectivity with and tributary flow to the South Yuba River. The effects of these spill events on erosion and plans for erosion control and restoration of damaged stream reaches are discussed in detail in sections 3.3.1.2.1, *Slope Stability and Erosion*. While the resulting aquatic resource habitat associated with the minimum streamflows proposed by NID and the relicensing stakeholders does not meet their preferred optimal criteria (80 percent of maximum habitat), other proposed measures for this stream reach (i.e., control and mitigation of channel erosion damage associated with spills from the Bowman-SpaULDing conduit, section 3.3.1.2.2, *Habitat Restoration*) would be expected to further improve habitat conditions for the aquatic resources.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach throughout the summer than under existing license conditions, particularly during below normal and wetter years. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide inter-annual variability in flows through this stream reach.

Chicago Park Development

Bear River Below Dutch Flat Afterbay Dam

NID proposes to provide minimum streamflows of 7 to 45 cfs, depending on month and water year type, in the Bear River below Dutch Flat afterbay dam (table 3-175). BLM condition 4 specifies and Forest Service recommendation 2 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

Our Analysis

Bear River inflow and discharges from the Dutch Flat No. 1 Development and Dutch Flat No. 2 Development are reregulated in Dutch Flat afterbay; a portion of that flow is diverted to the Chicago Park powerhouse via the Chicago Park flume and the excess is captured in storage and/or released downstream to the Bear River below Dutch Flat afterbay. The existing license requires 10 cfs minimum flow through the Bear River stream reach below Dutch Flat afterbay between May 1 and October 31 and 5 cfs between November 1 and April 30; proposed flows range from 7 to 45 cfs depending on month and water year. Under estimated unregulated conditions, the median monthly flow would be less than the proposed minimum flow during August and September in extreme critically dry, critically dry, and dry years, from August through October in below normal years, August through November in above normal years, and July through November in wet years. Highest estimated median monthly unregulated flows occur in February through May (51 to 83 cfs); estimated unregulated maximum flows occur during the same months (159 to 222 cfs). Historical flows under the existing license exhibit minimal variability between months. Historical median monthly flows range from 6.3 to 7.1 cfs between November and April and 11 to 12 cfs in May through October under the existing license. Minimum historical monthly flows range from 5.2 to 10 cfs under the existing license. The proposed minimum streamflows would create seasonal and inter-annual variability more typical of a natural hydrograph and ensure that minimum flows would be no less than 7 cfs during fall and winter in extreme critically dry to critically dry years, increasing to at least 30 to 45 cfs between February and June in above normal and wet years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-79) indicate that the amount of habitat for juveniles and adults peaks at about 15 cfs. Habitat for these two life stages decreases to about 80 to 84 percent of the peak at about 70 cfs and then increases gradually to a second peak at the upper model limit of 440 cfs. Available habitat for fry peaks at about 5 cfs, decreases to about 49 percent of maximum at about 20 cfs, and then increases to a second peak of 85 percent of maximum at 150 to 250 cfs. Maximum spawning habitat in the stream reach occurs at about 45 cfs. Proposed minimum streamflows would provide more than 82 percent of maximum habitat for adults year round in

all years (table 3-176). Proposed minimum streamflows would provide at least 90 percent of maximum habitat for juveniles in extreme critically dry and critically dry years (table 3-176); during above normal and wet years, juvenile habitat would decrease during peak spring flows to 84 to 91 percent of maximum. Proposed flows would generally provide 52 to 79 percent of maximum spawning habitat in extreme critically dry and critically dry years (table 3-176) and 79 to 100 percent in below normal to wet years.

In general, the HEA analysis indicates that available habitat (WUA) duration for adults under the proposed minimum streamflows would be similar or higher than both historical flows under the existing license and estimated unregulated flows (figure 3-80 provides an example for August and September). Between October and April, the exceedance curves for all three flow conditions (proposed, existing license, and estimated unregulated) are very similar, with the proposed flow conditions usually slightly higher than or identical to estimated unregulated flow conditions; from May through September, the proposed flows would provide significantly higher WUAs more frequently than under unregulated conditions, and would be almost identical to the existing license conditions.

All foothill yellow-legged frog life stages were found in moderate to high numbers in the Bear River below Dutch Flat afterbay dam. NID developed a habitat versus flow relationship for foothill yellow-legged frog at a site 1.2 miles downstream of Dutch Flat afterbay dam. During topographic data collection at least five foothill yellow-legged frog egg masses were noted at the site in late May 2009. The model indicated that the WUA for foothill yellow-legged frog eggs in May and June is highest at the lowest modeled flow of 4.4 cfs and decreases sharply as streamflows increase (table 3-177). Foothill yellow-legged frog eggs and tadpoles would have near 100 percent of maximum habitat available in extreme critically dry and critically dry years. Available egg habitat decreases to 30 percent or less in above normal and wet years; tadpole habitat remains at 95 percent during these wetter conditions.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach year round and particularly throughout the summer than under existing license conditions. The proposed minimum streamflows in this stream reach are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide seasonal and inter-annual variability in flows through this stream reach. Other measures (section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*) for this stream reach would provide additional flows and further improve conditions for both fish and foothill yellow-legged frogs.

Bear River Below Chicago Park Powerhouse

NID and the relicensing stakeholders do not propose or recommend minimum streamflows specific to the reach of the Bear River below the Chicago Park powerhouse. NID proposes an operational measure for this reach of the Bear River to maintain flows below the powerhouse at the beginning of an outage of the powerhouse or canal: Part 6, *Chicago Park Powerhouse Motoring*. BLM condition 6 specifies and Forest Service recommendation 4 and California Fish and Wildlife recommendation 2.6 recommend the same flow-related measure for this reach of the Bear River.

Our Analysis

Chicago Park Development is comprised of an off-channel powerhouse with water supplied through the Chicago Park flume from Dutch Flat afterbay. No dam or reregulating structures exist on the Bear River between the Dutch Flat afterbay dam and the high water level of Rollins reservoir about 1.5 miles downstream of the Chicago Park powerhouse tailrace. Flows in the Bear River below the Chicago Park powerhouse are an aggregate of: (1) minimum streamflows required below the Dutch Flat afterbay dam (discussed in the preceding section); (2) flows diverted from the Dutch Flat afterbay through the Chicago Park flume to the Chicago Park forebay, penstock, and powerhouse; and (3) tributary accretion below the Dutch Flat afterbay. There are no minimum streamflows required in the Bear River

below Chicago Park powerhouse tailrace under the existing license or PG&E's and the relicensing stakeholder's proposed and recommended measures other than those required upstream below the Dutch Flat afterbay dam. Under the proposed *Chicago Park Powerhouse Motoring* measure, NID would make a good faith effort to avoid non-routine planned outages of the powerhouse from May 1 through September 15 each year. Depending on water levels and time of the year, if an outage of the Chicago Park powerhouse does occur, flows normally diverted into the Chicago Park flume would begin to spill at the Dutch Flat afterbay dam increasing flows above the required minimum flow. There is a time lag between when the Chicago Park powerhouse shuts down and when the resulting increased flows in the Bear River released at the Dutch Flat afterbay reach the location of the Chicago Park powerhouse tailrace. Until the increasing flows in the Bear River arrive at the Chicago Park powerhouse tailrace, there would be a potential for a rapid decrease in flow in the Bear River below the tailrace. By motoring the Chicago Park powerhouse (i.e., continuing to pass water through the powerhouse without generating electricity) flows in the Bear River below the Chicago Park powerhouse would remain relatively stable during the initial period of the outage. Once the rising flows from Dutch Flat in the Bear River channel arrive at Chicago Park powerhouse, motoring of the powerhouse would be discontinued. This proposed measure would minimize any effects of flow fluctuations on available aquatic habitat during an outage of the Chicago Park powerhouse.

Steephollow Creek Below the Chicago Park flume

Under typical operation the Chicago Park Development does not discharge to and has no effect on flows and aquatic habitat in Steephollow Creek. NID and the relicensing stakeholders have not proposed any minimum streamflow measures for this stream reach.

Our Analysis

Steephollow Creek is a tributary to Bear River that flows under the Chicago Park flume; a population of foothill yellow-legged frog has been identified in this tributary. NID occasionally releases water from the Chicago Park flume during outages or high flow events that exceed flume hydraulic capacity. The potential effects of these high flow releases to Steephollow Creek on foothill yellow-legged frogs are subject to proposed baseline and high flow event monitoring and discussed in more detail in section 3.3.3.2.2, *Special Status Wildlife Species, Amphibians and Reptiles*.

Rollins Development

Bear River Below Rollins Dam

NID proposes to provide minimum streamflows of 15 to 125 cfs in the Bear River downstream of Rollins dam depending on month and water year (table 3-178). BLM condition 4 specifies and Forest Service recommendation 2 and California Fish and Wildlife recommendation 2.2 recommend the same monthly minimum streamflows.

Our Analysis

The minimum required streamflows under the existing license are 40 cfs from May 1 to October 31 and 15 cfs from November 1 to April 30 during dry years. During normal and wet years, minimum streamflows increase to 75 cfs from May 1 to October 31 and 20 cfs from November 1 to April 30. Except in November and December, historical median monthly flows under the existing license exceed estimated unregulated flows; maximum historical flows under the existing license exceed estimated unregulated flows throughout the year. From November to April, the minimum historical flows under the existing license are less than estimated unregulated flows, but are higher than estimated unregulated flows between May and October. Under estimated unregulated conditions, the median

monthly flow would be less than the proposed minimum flow from July through October in below normal and wetter years and from August through September in critically dry and dry years; the proposed minimum streamflows in extreme critically dry years are less than median estimated unregulated flows in all months. Highest estimated median monthly unregulated flows occur in February through May (214 to 354 cfs); unregulated maximum flows occur during January through May (760 to 1,013 cfs). Historical median and maximum flows under the existing license exhibit seasonal variability similar to estimated unregulated conditions. Historical median monthly flows range from 27 to 585 cfs, and minimum historical monthly flows range from 19 to 84 cfs under the existing license. The proposed minimum streamflows would support seasonal and inter-annual variability typical of a natural hydrograph.

Under the existing license, when the Bear River canal operates at maximum capacity, the remaining flow in the Bear River below Rollins dam is released to the lower Bear River as reflected in the relatively high historical flows compared to estimated unregulated flows. Once higher proposed minimum streamflows in upstream reaches have been met by NID and PG&E (i.e., to the Middle Yuba River at Milton diversion dam, to Canyon Creek below Bowman-Spaulding diversion dam, to South Yuba River below Lake Spaulding dam and to South Fork Deer Creek at the Deer Creek powerhouse), the median releases to the lower Bear River and diversions to the Bear River canal could decrease from that observed historically under the existing license. However, actual streamflows below Rollins dam during high flow periods of the year are likely to be higher than the proposed minimum streamflows during wetter years.

Habitat-flow simulations for resident rainbow trout in this stream reach (figure 3-81) indicate that the amount of habitat for juveniles and adults peaks at about 50 cfs and 125 cfs, respectively. Habitat for these two life stages decreases to about 56 to 72 percent of the peak at the upper model limit of 1,000 cfs. Available habitat for fry peaks at about 15 cfs, decreases to about 30 percent of maximum at about 400 cfs, and then increases to a second peak of 45 percent of maximum at 650 to 1,000 cfs. Maximum spawning habitat in the stream reach occurs at about 225 cfs. Proposed minimum streamflows would provide 26 to 35 percent of maximum habitat for adults year round in extreme critically dry years (table 3-179), rising to 73 to 100 percent in wet years. Proposed minimum streamflows would provide at least 83 percent of maximum habitat for juveniles year round in all years (table 3-179), except November to April in extreme critically dry years, when 74 percent of maximum spawning habitat would be available. Proposed minimum streamflows would generally provide 37 to 45 percent of maximum spawning habitat in extreme critically dry years (table 3-179), 65 to 75 percent in critically dry to below normal years, and 79 to 93 percent in above normal and wet years.

From December through May, available habitat (WUA) duration curves (HEA) for adults under the proposed minimum streamflows would be similar to historical flows under the existing license and slightly lower than estimated unregulated flows. Between June and October, the exceedance curves for proposed flows and existing license flow conditions are very similar and significantly higher than the curves for unregulated flows (figure 3-82 provides an example for July).

The habitat model was developed for one of the locations (RM 4.6) where foothill yellow-legged frog tadpoles were documented. NID and the relicensing stakeholders developed a habitat versus flow relationship for foothill yellow-legged frog and found that WUA for both foothill yellow-legged frog egg mass and tadpole life stages was highest at the lowest modeled flow of 11 cfs. The model indicated that the WUA for foothill yellow-legged frog eggs in May and June would be highest (99 percent of maximum) during extreme critically dry years and lowest (78 to 85 percent) during wet years (table 3-180). Foothill yellow-legged frog tadpoles would have 100 percent of maximum habitat available in extreme critically dry to dry years, decreasing to 85 to 96 percent in wet years.

The proposed minimum streamflows would ensure more aquatic habitat in this stream reach year round and particularly throughout the summer than under existing license conditions. The proposed minimum streamflows in this stream reach of the Bear River are likely to improve and enhance aquatic habitat compared to existing license conditions and would provide seasonal and inter-annual variability in flows through this stream reach.

3.3.2.2.3 Canal Outage Effects on Instream Flows

The Drum-Spaulding and Yuba-Bear Projects utilize a number of canals/conduits for inter-basin transfer of water for agricultural, commercial, municipal and domestic consumption as well as power generation. The cessation of flows in these canals during annual planned outages, non-routine planned outages, and emergency outages can affect the ability to deliver minimum streamflows (section 3.3.2.2.2, *Instream Flows*) in some project-affected stream reaches. PG&E (DS-AQR1, Part 4) and NID (YB-AQR3) propose to identify the schedule for annual and non-routine planned outages during the annual consultation meeting. The proposal also identifies notification procedures in the event of changes in the planned outage schedule or during emergency outages. Nine stream reaches in the Drum-Spaulding Project and six stream reaches in the Yuba-Bear Project are affected by canal operations (table 3-181).

Drum-Spaulding Project

Deer Creek Development

PG&E proposes (DS-AQR1, Part 4) that when either the South Yuba or Chalk Bluff canals, which supply the Deer Creek powerhouse, are out of service (typically for 2 weeks in late March and early April), there would be no minimum flow release to the South Fork Deer Creek as measured at gage YB-34. During an outage of the Deer Creek powerhouse or upstream feeder canals, the 5-cfs minimum release (table 3-125) from the Deer Creek powerhouse (section 3.3.2.2.2, *Instream Flows*) would be waived; flows in the short stream reach of the South Fork Deer Creek between the Deer Creek powerhouse and the NID non-project diversion dam would be natural unregulated flows from the upstream watershed of the South Fork Deer Creek. The Forest Service condition 29, BLM condition 4, and California Fish and Wildlife recommendation 2.5 are consistent with this measure.

Drum No. 1 and No.2 Development

Flows in the Bear River upstream of Drum afterbay are an aggregate of natural flows from the upper Bear River watershed and augmentation from the South Yuba canal (at gage YB-139) and the Drum canal (at gage YB-137). Compliance with minimum streamflows in this reach of the Bear River (5 to 13 cfs depending on month) is measured at gage YB-198 located between the South Yuba canal spill and the Drum afterbay (table 3-133). PG&E proposes a 1 to 2 cfs minimum release from the Drum canal spill gate to the Bear River depending on water year. Under normal proposed operations, any deficit between the proposed minimum streamflow (section 3.3.2.2.2, *Instream Flows*) and the sum of the Drum canal spill and natural flow in the upper Bear River would be made up by spill from the South Yuba canal. PG&E proposes that, during outages of the South Yuba canal (2 weeks in late March and early April) or the Drum canal (2 weeks in late September and early October), the minimum flow at gage YB-198 above Drum afterbay would be no less than natural flow in the Bear River; in addition, PG&E proposes, to the extent possible, to make up the deficit from the proposed minimum streamflow that results from the outage of one of the two canals with additional releases from the other operating canal. PG&E also proposes to avoid simultaneous outages of the Drum and South Yuba canals except during an emergency.

During outages of either South Yuba or Drum canal, PG&E proposes that the minimum flow in the Bear River downstream of Drum afterbay (YB-44) would equal the natural inflow to Drum afterbay;

except during an upstream canal outage, PG&E proposes minimum streamflows in the Bear River below the Drum afterbay dam of 10 to 16 cfs, depending on month and water year (table 3-140). PG&E would reduce its diversion from Drum afterbay to the Dutch Flat No. 1 Development in order to comply with the minimum streamflow. The Forest Service (condition 29 and recommendation 3), BLM (recommendation 2), and the California Fish and Wildlife (recommendation 2.5) proposals are consistent with this measure.

PG&E proposes (DS-TR40) to implement Bear River Management through Bear Valley upstream of Drum afterbay in order to reduce effects of winter and spill operations of the Drum canal on aquatic and riparian habitat in this stream reach. This proposal would limit winter operational releases from Drum canal measured at YB-137 to no greater than 200 cfs and would implement ramping rates of 0.4 foot/hour measured in the Bear River at YB-198 during increasing and decreasing releases from Drum canal at YB-137. PG&E would limit spills to the Bear River from Drum canal when Drum afterbay is forecast to spill and Dutch Flat no. 1 and no. 2 powerhouses are fully loaded. Forest Service (recommendation 5) and California Fish and Wildlife (recommendation 7.6) recommend the same limits on winter operational spills from Drum canal to Bear River.

PG&E also proposes limits on spills from Drum canal during outages of Drum canal or Drum no. 1 and no. 2 powerhouses as part of Bear River Management through Bear Valley. During outages expected to last more than 30 days PG&E would distribute spills from Drum canal between the Bear River spill gate at YB-137, RM 35.3, the Bear Valley spill gate at RM 33.6, and Tahoe spill gate at RM 31.75. PG&E also proposes to implement ramping when spill flows are reduced at these three spill gates; the rate of flow reduction would not exceed 50 cfs over a 6 hour period. Forest Service (recommendation 5) and California Fish and Wildlife (recommendation 7.6) recommend the same limits on winter operational spills from Drum canal to Bear River.

Alta Development

When the Drum canal is out of service, no water is available for diversion via the Towle diversion to Canyon Creek, a tributary to the North Fork of the North Fork American River. PG&E proposes that, during such outages, the minimum flow in Canyon Creek below the Towle diversion dam and Towle canal would be no less than the natural flow in Canyon Creek at gage YB-280, upstream of the inflow from the Towle diversion. During normal canal operations, the proposed minimum streamflows are 1 to 2 cfs (section 3.3.2.2.2, *Instream Flows*; table 3-136); during October and November outside of an outage, minimum streamflows in this reach of Canyon Creek would be 1 cfs. The Forest Service (recommendation 3), BLM (recommendation 2), and the California Fish and Wildlife (recommendation 2.5) proposals are consistent with this measure. Outages of the Drum canal, Towle canal, or Alta powerhouse can affect the ability to comply with proposed minimum streamflows (table 3-139) in Little Bear River below the Alta powerhouse tailrace and the non-project Lower Boardman canal diversion dam (section 3.3.2.2.2, *Instream Flows*). Proposed minimum streamflows in this reach of the Little Bear River are 0.5 to 4 cfs, depending on month and water year; during October and November when outages are typically scheduled, proposed minimum streamflows would be 0.5 to 1 cfs. PG&E proposes that, during any of these potential outages, the minimum streamflow in Little Bear River below PCWA's Lower Boardman canal diversion dam would be 0.25 cfs, and PG&E would not divert natural flow from the Little Bear River during these outages. The Forest Service (recommendation 3), BLM (recommendation 2), and California Fish and Wildlife (recommendation 2.5) proposals are consistent with this measure.

Wise and Wise No. 2 Development

When the Bear River canal is out of service (3 weeks in late October and early November), the primary inflow to Halsey afterbay is eliminated. Proposed minimum streamflow in Dry Creek below Halsey afterbay dam is 1 cfs year round in all water years (section 3.3.2.2.2, *Instream Flows*;

table 3-142). During an outage of the Bear River canal, PG&E proposes that minimum streamflows in Dry Creek below Halsey afterbay dam would equal seepage from Halsey afterbay dam. The Forest Service (recommendation 3), BLM (recommendation 2), and California Fish and Wildlife (recommendation 2.5) proposals are consistent with this measure.

Inflow to Rock Creek reservoir can be reduced during planned outages of Bear River canal, Upper Wise canal, and other portions of the lower Drum canal in late October to late November or during an emergency canal outage. During these outages, PG&E proposes that minimum streamflows in Rock Creek downstream of Rock Creek reservoir would be 0.5 cfs. Minimum streamflows during October and November outside of an outage would be 1 to 3 cfs, depending on water year type (section 3.3.2.2.2, *Instream Flows*; table 3-143). BLM proposed (recommendation 2) the same minimum streamflow conditions in Rock Creek below Rock Creek reservoir.

PG&E releases water from South canal downstream from the Wise powerhouses into Auburn Ravine. PG&E proposes that, during outages of Bear River canal, upper or lower Wise canal, or South canal when no project delivered water would be available, the minimum flow in Auburn Ravine at the South canal release point would be 0.5 cfs or the natural flow in Auburn Ravine, whichever is less; natural flow would be measured at an appropriate location to be determined in consultation with the relicensing stakeholders within 1 year of license issuance. Proposed minimum streamflows in Auburn Ravine below the South canal release point are 2 to 18 cfs depending on month and water year (section 3.3.2.2.2, *Instream Flows*; table 3-144); during October and November when outages are typically scheduled, proposed minimum streamflows would be 2 to 4 cfs depending on water year. The Forest Service (recommendation 3), BLM (recommendation 2), and California Fish and Wildlife (recommendation 2.5) recommend a minimum streamflow during canal outages of 5 cfs or the specified minimum streamflow for the month and water year type (table 3-144), whichever is lower, during a canal outage.

Newcastle Development

When Bear River canal, upper or lower Wise canal, or South canal are out of service there would be no flow to the Newcastle Development or supplemental flow from the Newcastle header box or powerhouse to the Mormon Ravine. With no other source of project-delivered water at Mormon Ravine, PG&E proposes that the proposed minimum flow for Mormon Ravine would be waived during outages of these project facilities. This proposal is consistent with Forest Service recommendation 3, BLM recommendation 2, and California Fish and Wildlife recommendation 2.5; minimum streamflows (50 to 200 cfs) recommended by Reclamation to support the coldwater pool in Folsom Lake (section 3.3.2.2.2, *Instream Flows*; table 3-147) apply only to January through May and could not be met during a canal outage.

Our Analysis

PG&E and the relicensing stakeholders have proposed minimum streamflows for project-affected stream reaches (section 3.3.2.2.2, *Instream Flows*); however, PG&E's ability to meet the proposed minimum flows in some stream reaches during outages of project canals can be severely limited given that there may be no water in the canal to release to the affected stream reach. Periodic outages are necessary to perform repairs and routine maintenance required for reliable, efficient, and safe operation of the project facilities. Planned outages for maintenance are generally limited to 2 or 3 weeks or less. The duration of an emergency outage would depend on the nature of the emergency. Advanced planning and minimizing canal outages is a priority for power generation and reliability of water deliveries as well as protection of aquatic resources.

The canal outage measure (DS-AQR1, Part 4) that PG&E proposes would ensure that the streamflow through an affected stream reach would not be less than the natural flow in the stream channel at that time. The minimum flow condition proposed for stream reaches affected by project canal outages effectively limits project diversions from affected stream reaches during canal outages and ensures that, at a minimum, natural flows pass through the associated diversion structures to the downstream reaches. The measure waives compliance with the proposed minimum streamflow for the respective month and water year where spills from canal structures augment the natural flows in the stream channel, as in Bear River above Drum afterbay from the Drum and South Yuba canals, Auburn Ravine from the South canal below the Wise and Wise No. 2 Development, and Mormon Ravine from South canal below the Newcastle Development. When the Bear River canal, Upper Wise canal, or Lower Wise canal is out of service, no water would be discharged from the Wise powerhouses to South canal; consequently, no water would be available in South canal to supplement natural flows in Auburn Ravine to comply with higher proposed minimum streamflows or the 5 cfs alternate minimum release proposed during a canal outage by California Fish and Wildlife and BLM. No other source of water is available to PG&E during a canal outage to make this augmentation. The only flow in Auburn Ravine near South canal during a canal outage would be the natural base flow at this location or discharges to Auburn Ravine made by other non-project water users not controlled by PG&E. The same situation applies to Mormon Ravine located at the lower end of South canal.

At locations where the canal involves a diversion structure on the affected stream reach, PG&E would pass the natural inflow to the diversion impoundment from upstream to the stream reach below the diversion dam, as at Bear River below the Drum afterbay dam, Dry Creek below the Halsey afterbay dam, and Rock Creek below the Rock Creek reservoir dam. At the Drum afterbay, PG&E would reduce diversion to the Dutch Flat no. 1 powerhouse, if necessary to ensure that natural flows from upstream are passed downstream the Bear River below the Drum afterbay dam. Similarly, regulated flows from non-project diversions in Dry Creek from upstream of Halsey afterbay would be passed to Dry Creek below Halsey afterbay dam.

The upper Bear River above the Drum afterbay is affected by operations of both the Drum and South Yuba canals; at this location PG&E's proposal would avoid simultaneous outages of both canals and, to the extent possible, would make up the difference from the canal that is still operating.

This reach of Bear River is also affected by high flows spilled from Drum canal during winter operations and during outages of the canal or Drum no. 1 and no. 2 powerhouses that could adversely affect channel morphology and riparian conditions in Bear River upstream of Drum afterbay. Implementation of the measures proposed by PG&E and the relicensing stakeholders would limit the magnitude of these high spill flows and the rate at which they increase and decrease which would better mimic the rate of flow change of a natural hydrograph. The proposal would dissipate the effects of spills by incrementally introducing spills during extended outages (longer than 30 days) over a 3.6-mile reach of the Bear River rather than at one point as typically occurs under the existing license. The PG&E proposal also includes qualitative and quantitative baseline surveys of this stream reach and follow-up annual surveys to document conditions in this stream reach, evaluate the effects of spills from the Drum canal on aquatic and riparian habitat in the stream reach, and recommend mitigation or modification of spill flow conditions, as necessary (section 3.3.1.2.2, *Habitat Restoration*, and section 3.3.3.2.1, *Riparian and Wetland Vegetation*). The combination of measures to manage high flows related to spills from Drum canal to Bear River and studies to determine the effects of these spills on aquatic and riparian habitat and recommend mitigation, as necessary, would ensure the protection and enhancement of aquatic resources in this reach of the Bear River.

The planning and scheduling components of this proposed measure would provide adequate advanced notification to resource agencies and other stakeholders during the annual consultation meetings

to ensure implementation of appropriate measures to minimize effects on aquatic resources. Such measures include a detailed plan for protection, collection, and relocation, as necessary, of fish trapped in the canals when the canals are drained during an outage (section 3.3.2.2.8, *Protection of Fish in Project Canals*). The proposed measure also establishes lines and procedures for communication during emergency canal outages to ensure that appropriate resource agencies, stakeholders, and the Commission are notified as soon as possible and that measures are implemented expeditiously to minimize effects on aquatic resources.

Yuba-Bear Project

Dutch Flat No. 2 Development

Outages of the Bowman-Spaulding conduit and the Drum canal have the potential to affect minimum streamflows in several tributaries to Canyon Creek and South Yuba River and the Bear River associated with operation of the Dutch Flat No. 2 Development.

Texas (tributary to Canyon Creek), Clear, Trap, Fall, and Rucker Creeks (tributaries to South Yuba River) are transected by the Bowman-Spaulding conduit; flow in each of these tributaries from upstream of the Bowman-Spaulding conduit is diverted or flows directly into the conduit. Under the existing license, water in excess of the capacity of the Bowman-Spaulding conduit can be spilled back to the respective stream channel below the conduit. NID proposes to provide minimum streamflows under the new license in Texas, Clear, Trap, and Rucker Creeks (section 3.3.2.2.2, *Instream Flows*). During outages when the Bowman-Spaulding conduit is drained, it could be difficult depending on the time of year and water year for NID to meet the proposed minimum streamflows below the conduit.

NID proposes specific minimum streamflows during annual outage of the Bowman-Spaulding conduit. During non-outage periods, NID makes the minimum flow releases to these tributaries at five locations: from the Texas Creek diversion dam, Fall Creek diversion dam, and directly from the Bowman-Spaulding conduit into Clear, Trap, and Rucker Creeks. At each of these locations during a Bowman-Spaulding conduit outage of 30 consecutive days or less, NID would ensure that the flow in each of these five creeks downstream of the Bowman-Spaulding conduit is the same as the flow in the creek upstream of the conduit. This would be accomplished by not diverting any water into the Bowman-Spaulding conduit during the outage. In addition, the measure provides that if an outage extends past 30 consecutive days, NID would consult with the Forest Service, California Fish and Wildlife, and the California Water Board regarding interim minimum flow conditions. The Forest Service (condition 29) and BLM (condition 5) specify and California Fish and Wildlife (recommendation 2.3) recommends the same minimum flow conditions for these stream reaches during outage of the Bowman-Spaulding conduit.

The ability of NID to comply with proposed minimum streamflows in Bear River below the Dutch Flat afterbay dam (section 3.3.2.2.2, *Instream Flows*; table 3-175) can be limited during an outage of the Drum-Spaulding Project's Drum canal. When the Drum canal is drained during an outage, augmentation of flows in the Bear River from the Drum canal spillgate and the Drum no. 1 and no. 2 powerhouses is eliminated and flows in the Bear River entering the Dutch Flat afterbay can be significantly reduced. When the Drum canal is out of service, NID and BLM proposes to maintain proposed minimum streamflows (table 3-175) below the Dutch Flat afterbay dam until water level in the afterbay drops to 2,700 feet msl (normal maximum water surface elevation is 2,741 ft msl); thereafter, the minimum flow below the Dutch Flat afterbay dam would equal the inflow to the afterbay until the Drum canal returns to service.

Our Analysis

The measure proposed by NID and the relicensing stakeholders to adjust proposed minimum streamflows during outages of project canals would ensure that minimum streamflows in the affected stream reaches would at least equal the natural flow in the stream. Five tributaries of Canyon Creek and South Yuba River (Texas, Clear, Fall, Trap, and Rucker Creeks) that are transected by and diverted to the Bowman-Spaulding conduit have no minimum streamflow under the existing license and are generally dry below this conduit during much of the year. NID and the relicensing stakeholders have proposed minimum streamflows for each of these stream reaches below the Bowman-Spaulding conduit, but an outage of the conduit can affect NID's ability to meet these proposed minimum flows. During typical operation in summer and fall when there is no outage during some years there may be no inflow from upstream of the Bowman-Spaulding conduit in these five stream; under the proposed minimum streamflow measure the specified minimum streamflow during these times would be made up from water in the conduit. The canal outage measure proposed by NID ensures that, during an outage of the Bowman-Spaulding conduit, minimum streamflows below the conduit would be no less than the inflow into the diversion from the upstream reaches of these five creeks. When the Bowman-Spaulding conduit is drained during an outage, no water is available in the conduit to augment flows in the creeks below the conduit to meet higher proposed minimum streamflows, but this measure ensures that no water is diverted from these creeks during the outage and aquatic habitat is protected to the extent possible in these five project-affected stream reaches.

Dutch Flat afterbay is a reregulating reservoir, with relatively small storage capacity (1,359.2 acre-feet), that diverts water to the Chicago Park forebay and powerhouse via the Chicago Park flume. Inflow to Dutch Flat afterbay comes primarily from the Bear River below the Drum afterbay dam, the Drum-Spaulding Project's Dutch Flat no.1 powerhouse, and the Yuba-Bear Project's Dutch Flat no. 2 powerhouse; a relatively small contribution comes from Little Bear River below the Drum-Spaulding Project's Alta powerhouse. A significant portion of the flow in the Bear River upstream of the Drum afterbay is transferred from Lake Spaulding to the Bear River via the Drum-Spaulding Project's Drum canal. Consequently, during an outage of these canals, flow in the Bear River is limited to the natural flow at that time, which could be significantly less than the minimum streamflows proposed by NID during non-outage periods. The measure proposed by NID and BLM uses the limited storage in the Dutch Flat afterbay and shuts down the Chicago Park flume, curtailing power generation at the Chicago Park powerhouse in order to maintain the proposed minimum flows as long as possible during an outage and ensures that the minimum streamflow in the Bear River below the Dutch Flat afterbay dam during the outage is no less than the natural flow in the Bear River entering the Dutch Flat afterbay.

Proposed minimum streamflows in these six project-affected reaches can be higher than estimated unregulated flows would be in these reaches during natural low-flow periods of the year (late summer and fall) and have been proposed in order to enhance aquatic habitat in these stream reaches. During canal outages it may be difficult to comply with the proposed minimum streamflows in these project-affected reaches without the water available from the canal to augment natural flow. The proposed measures would ensure that the existing natural flows in the five creeks affected by the Bowman-Spaulding conduit and in the Bear River below the Drum canal and Drum afterbay would not be reduced by project operations during an outage. In the case of the Bear River, NID would use reasonable measures to sustain the required minimum flows as long as possible during an outage including shutdown of the Chicago Park flume and powerhouse.

3.3.2.2.4 Spill Cessation and Minimization of Flow Fluctuations

Sudden reduction in flow following spring snow-melt runoff or following other major spill events can affect aquatic habitat by potentially stranding some life stages of aquatic organisms as water level

drops and previously inundated habitat rapidly drains. To minimize these adverse effects, NID and PG&E propose operating measures during spill cessation to mimic a flow recession limb more typical of a natural hydrograph characteristic of unregulated rivers. These operating measures would also reduce rapid flow fluctuations following other major flow events. PG&E and NID negotiated this measure with the relicensing stakeholders; the Forest Service (condition 29) and BLM (condition 7) specify and California Fish and Wildlife (recommendations 2.7 and 2.8) recommends the same spill cessation schedules (discussed below for each applicable project development). Spill cessation measures would be implemented for the Drum-Spaulding Project in South Yuba River below Lake Spaulding dam and for the Yuba-Bear Project in Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman-Spaulding diversion dam, and Bear River below Dutch Flat afterbay dam. NID and BLM (condition 8) proposed an additional measure to control spills and flow fluctuation in the Bear River below Rollins dam.

Drum-Spaulding Project

Spaulding No. 1 and No. 2 Development

To minimize the effects of sudden reductions in flow on aquatic habitat and biota, PG&E proposes (DS-AQR1, Part 7) a two-part spill cessation schedule (tables 3-182 and 3-183) for the South Yuba River at the Lake Spaulding dam following spill events; the proposed schedule would gradually reduce flow to the appropriate proposed minimum streamflow for that month and water year (section 3.3.2.2.2, *Instream Flows*; table 3-121) over a period of up to 21 days. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.8 recommends the same spill cessation schedule.

PG&E and the relicensing stakeholders have agreed on this flow-based, two-tiered spill cessation schedule for South Yuba River below Lake Spaulding dam; compliance would be measured between the confluence of Jordan and Rucker Creeks in the South Yuba River. The higher flow spill cessation schedule (when flows are between 250 and 420 cfs) applies only to wet, above normal, and below normal years (table 3-182; figure 3-83) and is also intended to provide recreational whitewater boating opportunities (section 3.3.5.2, *Recreation Flows*). When flow decreases to 250 cfs or less in the South Yuba River, the lower flow spill cessation schedule (table 3-183) would be implemented in all water years, gradually reducing flow from 250 to 50 cfs (or the proposed minimum flow for that month and water year; table 3-121) over a 21-day period. PG&E has agreed to make a good faith effort to meet the target flows in the lower flow spill cessation schedule given the constraints of head at the radial gates at Lake Spaulding dam. PG&E would also make a good faith effort during the applicable water years to implement the high flow cessation schedule at least once between May 2 and September 30. PG&E would avoid short-term spills that would increase streamflow more than 100 percent in a 12-hour period between the end of the spill cessation and September 30 in years when the spill cessation schedules are implemented.

Our Analysis

Rapid changes in streamflow associated with management of spill conditions at dams can have a significant effect on aquatic habitat and the organisms that depend on that habitat. Frequently, dams are operated to sharply curtail flow when inflow decreases to a level when the dam stops spilling at the end of an uncontrolled spill event; the resulting quick decrease in discharge can rapidly dewater habitat and strand aquatic organisms below the dam. Less mobile early life stages such as eggs and tadpoles of foothill yellow-legged frog are particularly vulnerable to stranding and desiccation at these times. The proposed measure would gradually reduce downstream flow in the South Yuba River below Lake Spaulding dam at a rate more characteristic of natural flow cessation following a major runoff event in unregulated rivers. The proposed spill cessation schedule gradually reduces flow in time steps of several

days until the minimum flow in the South Yuba River below Lake Spaulding dam has been reached. The measure potentially provides higher than proposed minimum streamflows (table 3-121) for periods of 21 to 27 days following a major spill event. Because major spill events are associated with snow melt in late spring and early summer, these higher than minimum streamflows could serve as an additional enhancement of habitat for resident rainbow trout spawning. The proposed schedule for flow reduction at Lake Spaulding dam would also have the added benefit of providing predictable whitewater recreational boating opportunities (section 3.3.5.2, *Recreation Flows*).

Yuba-Bear Project

Bowman Development

Middle Yuba River Below Milton Diversion Dam

NID proposes to implement a spill cessation schedule at Milton diversion dam (table 3-184) after May 1 of each calendar year or as soon as NID closes the upstream Jackson Meadows dam spill gates, whichever comes later. During the first 6 days of the spill cessation schedule, the flow released at Milton diversion dam would be held at 300 cfs, which would also provide flows adequate for recreational whitewater boating in the reach of Middle Yuba River below the Milton diversion dam (section 3.3.5.2, *Recreation Flows*). During the spill cessation schedule, flows are decreased from 300 to 50 cfs over a 22-day period (figure 3-84); however, the flow cessation schedule would terminate when the target flow in the spill cessation schedule equals the minimum streamflow required for that date. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.7 recommends the same spill cessation schedule.

NID would avoid short-term spills at Milton diversion dam that would increase flow more than 100 percent in a 12-hour period between the end of spill cessation and September 30 in years when the spill cessation schedule is implemented.

Canyon Creek Below Bowman-Spaulding Diversion Dam

NID proposes to implement a spill cessation schedule at the Bowman-Spaulding diversion dam (table 3-185) after April 1 of each calendar year. During the spill cessation schedule flows are decreased from 275 to 45 cfs over a 21-day period (figure 3-85); however, the flow cessation schedule would end when the target flow in the spill cessation schedule equals the required minimum streamflow. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.7 recommends the same spill cessation schedule.

NID would avoid short-term spills at Bowman-Spaulding diversion dam that would increase flow more than 100 percent in a 12-hour period between the end of the spill cessation and September 30 in years when the spill cessation schedule is implemented.

Chicago Park Development

NID proposes to implement a spill cessation schedule at the Dutch Flat afterbay dam during periods following an outage of the Chicago Park flume and/or powerhouse that causes spilling at the Dutch Flat afterbay dam between May 1 and September 30. During an outage of the Chicago Park flume/powerhouse, NID would release 50 to 100 cfs from the Dutch Flat afterbay dam low-level outlet to Bear River below Dutch Flat afterbay dam; flow would be held as close to 100 cfs as possible to balance inflow to Dutch Flat afterbay and maintain the water surface elevation in the afterbay at or above 2,732 feet msl, the level necessary for reliability of Dutch Flat no. 2 powerhouse. The spill cessation schedules would be implemented when the Chicago Park flume and powerhouse are brought back online

and spills would cease at the Dutch Flat afterbay dam ogee-crest spillway; the spill cessation schedule would continue until the required minimum streamflow for that water year type and month is reached. Two spill schedules are proposed: (1) following spills at Dutch Flat afterbay dam lasting 3 day or less (table 3-186); and (2) spills lasting more than 3 days (table 3-187). These spill cessation schedules reduce flow in the Bear River between Dutch Flat afterbay dam and the Chicago Park powerhouse from 75 to 25 cfs over a period of 3 days or 21 days, respectively (figure 3-86). BLM condition 7 specifies and Forest Service recommendation 5 and California Fish and Wildlife recommendation 2.7 recommend the same spill cessation schedule.

In combination with this measure to avoid sudden decreases in Bear River flow below the Chicago Park powerhouse, at the beginning of outages at the Chicago Park Development, NID also proposes the *Chicago Park Powerhouse Motoring* measure discussed previously (section 3.3.2.2.2, *Instream Flow*).

Rollins Development

In order to minimize rapid flow fluctuation in the Bear River downstream of Rollins dam, NID proposes the *Rollins Reservoir Elevation Control* measure; this measure is consistent with BLM condition 8, Forest Service recommendation 6, and California Fish and Wildlife recommendation 2.7. When the water surface elevation is within the upper 2 to 3 feet of the reservoir full pool (El. 2,171 feet), flow releases from Rollins dam would be managed to balance inflow to Rollins reservoir and downstream water supply demand to minimize rapid changes in flow downstream of the dam. After May 1 of each calendar year, when inflow to Rollins reservoir begins to subside and Rollins dam stops spilling, NID would manage the reduction in downstream releases to keep pool elevation in Rollins reservoir within the top 2 to 3 feet, while also managing flow releases below Rollins dam so that stage (water depth) in the Bear River downstream does not decrease by more than 1 foot total during any 3-week period.

Our Analysis

Rapid changes in streamflow associated with management of spill conditions at dams in the Yuba Bear Project can have a significant effect on aquatic habitat and the organisms that depend on that habitat. Frequently, in order to maximize storage, dams are operated to sharply curtail flow when the dam stops spilling at the end of an uncontrolled spill event; the resulting quick decrease in discharge can rapidly dewater habitat and strand aquatic organisms. Less mobile early life stages such as eggs and tadpoles of foothill yellow-legged frog are particularly vulnerable to stranding and desiccation. The proposed measures would gradually reduce downstream flow in the Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman-Spaulding diversion dam, and Bear River below Dutch Flat afterbay dam at a rate more characteristic of natural flow cessation following major runoff events in unregulated rivers. The proposed spill cessation schedule at each dam is in effect until the required minimum streamflow is attained for these three stream reaches. The proposed measures potentially provide higher flows than the required minimum streamflows for periods of 21 to 22 days below Milton diversion dam and Bowman-Spaulding diversion dam following a spill event, which could benefit spawning habitat for resident rainbow trout. The short- and long-term spill cessation schedules for Dutch Flat afterbay associated with outages of the Chicago Park powerhouse would potentially provide 3 to 21 days, respectively, of flows above the required minimum.

The measure proposed to manage flow fluctuations at Rollins reservoir has been designed to provide operational flexibility while minimizing frequent, rapid fluctuations in reservoir level and in downstream flow associated with fluctuating inflow to the reservoir from the upstream Bear River. NID would use the upper 2 to 3 feet of the reservoir pool to buffer inflow fluctuations and balance downstream releases. Providing more consistent flows and more gradual changes in flow and water level (no more

than 1 foot over a 3-week period) in Bear River below Rollins dam would provide more reliable aquatic habitat in this stream reach.

In addition to the benefit to aquatic resources, the spill cessation schedule proposed for the Milton diversion dam would also provide a relatively predictable opportunity for recreational whitewater boating in the Middle Yuba River (section 3.3.5.2, *Recreation Flows*). The proposed schedule for flow reduction at Bowman-Spaulding diversion dam would also have the added benefit of providing whitewater boating opportunities that can be predicted on a short-term basis (section 3.3.5.2, *Recreation Flows*).

3.3.2.2.5 Monitoring Compliance With Instream Flow Measures

In order to ensure compliance with required minimum streamflows, PG&E and NID identified specific compliance monitoring locations within each project-affected stream reach for which minimum streamflows are proposed. With the exception of 10 locations in the Drum-Spaulding Project and 8 locations in the Yuba-Bear Project, all proposed compliance sites have existing gages that would require no modification. Compliance with minimum streamflows would be based on instantaneous (continuous monitoring instrumentation) flow measurement at these gaging locations. The Forest Service (condition 31) and BLM (condition 9 [Drum-Spaulding Project] and condition 13 [Yuba-Bear Project]) specify and California Fish and Wildlife (recommendation 4), Reclamation (recommendation A.1.b), and FWS (recommendation 5) recommend that a stream gaging plan be developed in coordination with the agencies and implemented once approved by the agencies. PG&E and NID submitted implementation plans for streamflow measurement with the amended final license application and supplemental final license application filings.

At remote locations where winter access is unreliable and unsafe, PG&E (DS-AQR1, Part 3) and NID (YB-AQR1, Part 5) propose flow setting measures as part of minimum streamflow compliance; they propose periodic adjustment of outlet works at these remote locations for minimum flow compliance during the rest of the year. Forest Service condition 29 and California Fish and Wildlife recommendations 2.4 and 2.5 are consistent with the PG&E and NID proposals.

Instantaneous Measurement and Compliance

PG&E proposes construction of new gages (table 3-188) at two locations in the Spaulding No. 1 and No. 2 Development (below Meadow Lake and White Rock Lake dams). Eight existing gages on Drum-Spaulding Project-affected stream reaches would require capacity upgrades to measure the higher proposed minimum streamflows for the associated stream reaches: (1) Rucker Creek below Rucker Lake (Spaulding No. 3 Development); (2) Lake Creek below Feeley Lake (Spaulding No. 3 Development); (3) South Yuba River at Lang's Crossing (Spaulding No. 1 and No. 2 Development); (4) North Fork of the North Fork American River below Lake Valley reservoir (Drum No. 1 and No. 2 Development); (5) North Fork of the North Fork American River below Lake Valley canal diversion dam (Drum No. 1 and No. 2 Development); (6) Sixmile Creek below Kelly Lake (Drum No. 1 and No. 2 Development); (7) Canyon Creek below Towle canal diversion dam (Alta Development); and (8) Little Bear River below Lower Boardman canal diversion dam (Alta Development).

NID proposes modifications to existing gages at three locations in the Bowman Development (Canyon Creek below French Lake dam, Faucherie Lake dam, and Sawmill Lake dam) to provide for measurement of the higher proposed minimum streamflows, and proposes construction of new gages at five additional locations associated with the Dutch Flat No. 2 Development (below the respective diversion structures on Texas, Clear, Fall, Trap, and Rucker Creeks at the Bowman-Spaulding conduit) (table 3-189).

Our Analysis

PG&E and NID filed plans to monitor compliance with minimum flows in the new licenses. Under their proposals, continuous monitoring that is ongoing at existing gages under the existing license would continue uninterrupted. Where the gage capacity needs to be upgraded or a new gage would be required, they propose to design and install appropriate gages and implement monitoring within 1 year of license issuance; during the interim, the licensees would make a good faith effort to provide the necessary minimum streamflows. The applicants' proposed implementation plans outline maintenance and quality control programs designed to ensure the accuracy and reliability of the stream gaging network consistent with USGS protocols. The plans also include procedures and schedules for submission of monitoring data to the involved agencies. The proposed streamflow compliance monitoring plans would require approval by the relicensing stakeholders before full implementation, but conceptually appear to be adequate to demonstrate instantaneous compliance with minimum streamflows proposed for the new license. Operation of the existing streamflow gaging system in compliance with USGS standards, in conjunction with the proposed upgrades to some existing gages and construction of new gages would provide adequate instrumentation in appropriate locations to document compliance by both projects with proposed minimum streamflows in all major project-affected reaches.

Minimum Streamflow Compliance at Remote Project Dams

PG&E proposes to use flow setting protocols for compliance with required minimum streamflows at 16 projected-affected stream reaches and NID proposes 1 location for flow setting compliance measures (table 3-190). Given the difficulty and safety issues involved in accessing these remote locations during winter, PG&E and NID propose a measure to set the low-level outlet at each of these dams to provide the respective required minimum streamflows for the duration of the winter, beginning no later than November 1 each year. The act of setting the low-level outlet to release the winter minimum streamflow would meet the license compliance requirement. The winter setting would remain until PG&E and NID can first safely access the low-level outlets at each of these dams again the following spring or early summer.

Once the licensees can safely access these dams the following spring, the outlet works would be checked and reset, as necessary, on the periodic basis specified in table 3-190. Compliance with minimum streamflows at these remote locations would be the act of checking and resetting the low-level outlet as scheduled until the winter setting is made later that year.

Our Analysis

Many of the high elevation headwater lakes that capture snowmelt in these projects are very remote and cannot be safely accessed once the roads are closed by snow. Access is necessary because the outlet works at these dams are adjusted manually to meet minimum streamflow requirements. Even when access roads are snow-free and in good maintenance, it requires considerable time to reach many of these locations. Estimated unregulated flows in the affected stream reaches would be relatively low or zero, with the exception of the period of peak snow melt (section 3.3.2.2.2, *Instream Flows*). The proposed minimum streamflows at these locations are generally 1 cfs or less in most months and water years (section 3.3.2.2.2, *Instream Flows*). Given these conditions, the proposed periodic schedule for setting release flows at these outlet works is a reasonable balance of the need to monitor and ensure compliance with minimum streamflows and operational feasibility.

3.3.2.2.6 Effects on Water Storage and Use

A primary purpose of many of the reservoirs, canals, and conduits that comprise the two projects is for the storage, transfer, and delivery of water for agricultural, domestic, municipal, and commercial

users within the NID and PCWA water supply service areas. Relicensing these projects would not alter the existing, legally established water rights, water delivery contracts, or water supply demand; however, proposed increases in minimum streamflows to various stream reaches compared to the existing license would change the balance and seasonal pattern of water storage and transfer within the system and potential for hydropower generation. Changes in minimum streamflows and release schedules at locations throughout the project discussed previously (section 3.3.2.2.2, *Instream Flows*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*) are expected to have a positive effect on aquatic and riparian habitat compared to existing license conditions (no-action alternative). The applicants have performed extensive modeling to evaluate the effects of various stakeholder conditions and recommendations on system water balance, power generation, water quality (water temperature), and water delivery deficits under various water year conditions (section 3.3.2.2.1, *Water Years*).

In conjunction with developing the proposed minimum streamflows, PG&E, NID, and the relicensing stakeholders modeled water delivery and power generation using the U.S. Army Corps of Engineers' Hydrologic Engineering Center (HEC) Reservoir Simulation (ResSim) modeling software to evaluate how various flow proposals discussed above could affect the balance of various project uses. This model simulates daily integrated operations of the Yuba-Bear and Drum-Spaulding Projects' facilities based on specific operating conditions prioritized in the following order: minimum streamflow by reach, minimum reservoir pool, water delivery, and power generation requirements. The model simulates the integrated and inter-dependent operations of the Yuba-Bear and Drum-Spaulding Projects. Estimated mean daily unregulated streamflow for water years 1976 to 2008 was used as the source of water to the projects for simulation of each flow scenario. The applicants modeled three scenarios: existing license conditions (no-action alternative); proposed project using recent water delivery demands; and proposed project using projected water delivery demands. Optimum flow for aquatic habitat was adjusted, as necessary, to balance power generation and water supply demand. Table 3-191 summarizes the model assumptions for each scenario.

Our Analysis

Under the no-action alternative, the model determined that the minimum streamflows and reservoir pool elevation required under the existing license for both projects were met at all times; however, water deliveries were not met in 2 (1977 and 1978) of the 33 water years of record. The water delivery deficits in water year 1978 were attributed to carryover effects in the early fall from water delivery deficits in water year 1977. Annual average power generation by project powerhouse is summarized in table 3-192. On average, project reservoirs experience moderate drawdowns.

Proposed minimum streamflow and reservoir pool elevation requirements are met under proposed project conditions using recent water delivery demands in all stream reaches and reservoirs for the Yuba-Bear Project. The following stream reaches in the Wise and Wise No. 2 Development of the Drum-Spaulding Project, however, would not meet proposed minimum streamflow requirements during 2 years of the period of record: Dry Creek below Halsey afterbay dam in water year 1977; Auburn Ravine below the South canal release in water years 1976 and 1977; and Rock Creek below Rock Creek reservoir dam in water years 1976 and 1977. PG&E noted in the supplement to the final license application (August 30, 2012) that the noncompliance with the proposed minimum streamflow requirements in these stream reaches is likely due to insufficient natural flow during dry conditions in the upstream watersheds of these stream reaches. Additionally, PG&E states that the model meets the water delivery requirements to the Bear River canal and, in doing so, depletes overall water supply to the point that the system is unable to meet minimum streamflow requirements in the stream reaches listed above.

Under the proposed project conditions, water delivery deficits would occur in one additional year, 1976, for the Drum-Spaulding Project, and in two additional years, 1976 and 1989, for the Yuba-Bear

Project. Both projects exhibit substantially increased water delivery deficits in water years 1977 and 1978 compared to the existing license conditions. The Drum-Spaulding and Yuba-Bear Projects experience a 9.8 and 11.4 percent power generation loss due to the proposed increased minimum streamflow requirements for the Middle Yuba River, Canyon Creek (Bowman Development), and South Yuba River (Spaulding No. 1 and No. 2 Development). Generation losses are most evident for lower watershed powerhouses along the Bear River and associated with the Bear River canal, Wise canals, and South canal. Under the proposed action using recent water delivery demands, the model predicted some reservoirs with higher winter carryover or early spring water levels. However, by late summer and early fall most reservoirs would be significantly depleted below reservoir elevations under the existing license, potentially having an adverse effect on recreational uses, particularly the use of boat ramps (section 3.3.5.2, *Recreation Flows*).

The proposed projects with future water delivery demands (projected to 2062, 50 years in the future) predict that minimum streamflow requirements are met for the Yuba-Bear Project. The same stream reaches that did not meet proposed minimum streamflow requirements in the Drum-Spaulding Project using recent water delivery demands did not meet minimum streamflow requirements using projected future water delivery demands. This scenario also projected that water delivery deficits occur in an additional 25 years as compared to the existing license conditions. NID water delivery demands are not met during all of the 25 years of water delivery deficits, while PCWA's water delivery demands supplied by Drum-Spaulding Project operations are met in all but 3 of the 25 years. Power generation losses under this scenario increase to 13.1 and 15.6 percent for the Drum-Spaulding and Yuba-Bear Projects, respectively. Similar to the proposed project using recent water demands, some reservoirs had higher winter carryover elevations or early spring water levels, but by late summer and early fall, most of the reservoirs were projected to have more severe drawdown compared to the no-action alternative.

In general, the model predicts that under current water delivery demands, the system-wide flow manipulations under the proposed action are adequately balanced such that: (1) minimum streamflow conditions can be met with the exception of a few stream reaches with natural unregulated low-flows; (2) water delivery deficits are not significantly exacerbated; and (3) power generation is minimally reduced. However, when the proposed action is modeled with water delivery projected at future demand (2062), water delivery deficits and power generation losses increase substantially in magnitude and frequency. The model developed by PG&E and NID does, however, provide the stakeholders a useful tool for long-term planning and evaluation of measures outside of the Commission's jurisdiction to mitigate projected water delivery deficits in balance with other system demands.

3.3.2.2.7 Water Quality

Flow Augmentation for Water Temperature Management

As discussed previously, PG&E, NID, and the relicensing stakeholders have generally agreed on minimum streamflows that are significantly higher in most project-affected stream reaches (section 3.3.2.2.2, *Instream Flows*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*) to enhance aquatic habitat and provide cooler water temperatures compared to conditions under the existing license (no-action alternative). Even with these proposed minimum streamflow increases, model results indicate that summer water temperatures in some key project-affected stream reaches could approach stressful levels for cold water aquatic species including resident rainbow trout, particularly during warmer years. To address this issue, several stakeholders filed proposals to augment flow in selected stream reaches during these periods that would further reduce water temperatures to benefit aquatic resources.

Drum-Spaulling Project (Spaulding No. 1 and No. 2 Development) – South Yuba River Below Lake Spaulding dam

Daily average water temperatures in South Yuba River below Lake Spaulding dam in the vicinity of the confluence of Canyon Creek and downstream to Poorman Creek occasionally exceed 20°C, and instantaneous temperatures approach temperatures potentially stressful to resident rainbow trout. These stream reaches are popular with recreational anglers and are managed for resident trout fishing by California Fish and Wildlife. Two different proposals have been filed to augment flows released from Lake Spaulding dam in order to manage water temperatures to support coldwater habitat in these stream reaches of the South Yuba River.

Forest Service condition 29 for the Drum-Spaulling Project specifies implementation of *Supplemental Flow* releases intended to improve management flexibility for maintenance of cold water temperatures to enhance aquatic habitat in the South Yuba River below Lake Spaulding dam (Spaulding No. 1 and No. 2 Development). PG&E does not propose *Supplemental Flow* releases, but in its alternatives to Forest Service conditions, PG&E accepted the Forest Service *Supplemental Flow* condition for this reach of the South Yuba River. The Forest Service *Supplemental Flow* condition would manage flows between July 1 and mid-September in order to maintain South Yuba River water temperature at or below 20°C upstream of the Canyon Creek confluence to “enhance habitat of resident rainbow trout without decreasing habitat or otherwise negatively impacting foothill yellow-legged frog or other native species, such as hardhead.” The *Supplemental Flow* schedule (table 3-193) specified by the Forest Service would apply during critically dry, dry, and below normal years. Required minimum streamflows would be augmented by 5 to 10 cfs, depending on water year type, up to 30 cfs total (required minimum plus supplement) streamflow in the reach. *Supplemental Flow* releases would be made from the Lake Spaulding cold water pool using the low-level outlet at Lake Spaulding dam.

California Fish and Wildlife (recommendation 2.9) and the Foothills Water Network recommend a similar measure (referred to as the *Block Flow* recommendation) to augment South Yuba River flows for water temperature management during the summer. However, they recommend allocating a “Block of Water” not to exceed 2,500 acre-feet to maintain South Yuba River water temperature, measured immediately upstream of the Canyon Creek confluence, at 19°C between June 15 and September 15, with the additional objective of maintaining water temperature above the confluence of Poorman Creek at or below 20°C. During exceptionally hot periods, this proposed measure includes an additional requirement to further augment flows during periods when air temperatures are forecasted to exceed 32°C for 2 or more days during the subsequent 7-day period (referred to as a heat storm). The *Block Flow* proposal would require additional releases above the proposed minimum streamflow at Lake Spaulding dam in 5- to 10-cfs increments up to a total instream flow of 60 cfs to manage water temperature. The *Block Flow* recommendation includes creation of the South Yuba River Water Temperature Operations Group composed of representatives of PG&E, NID, the Forest Service, California Fish and Wildlife, BLM, California Water Board, and two non-governmental organizations to be identified. This Operations Group would provide real-time review and recommendations for water temperature management during the flow augmentation period, and would meet at least once annually in May to review and discuss program information. The Foothills Water Network recommendation also proposes to reduce winter minimum streamflows (February and March) to 25 cfs during dry, below normal, above normal, and wet years to partially offset the reduced power generation that would result from implementation of the *Block Flow* measure.

PCWA asked the Commission to reject the *Block Flow* recommendation proposed by California Fish and Wildlife and the Foothills Water Network because (1) the proposed temperature criteria are inappropriate and would potentially reduce preferred habitat and jeopardize special status species including foothill yellow-legged frog and hardhead; and (2) increased discharges would increase power

generation losses and water supply deficits. PCWA recommends adoption of the Forest Service's South Yuba River *Supplemental Flow* condition because it would provide a better balance of power generation, water supply, and environmental resources.

Our Analysis

Cold water habitat in the South Yuba River is maintained by low-level releases from Lake Spaulding dam (Spaulding No. 1 and No. 2 Development) and supports a recreational fishery for resident rainbow trout and brown trout. Temperature modeling results presented by PG&E for the South Yuba River (Amended License Application Supplement 4, Attachment 2B [January 23, 2013]) provide analysis of the relative effects of different flow releases at Lake Spaulding dam on downstream water temperatures in the South Yuba River based on weather conditions that occurred during 2008 and 2009, which were warm, dry years. During summer, water temperatures in the South Yuba River gradually warm with distance downstream and heating from warmer ambient air temperatures (figure 3-87 [2008] and figure 3-88 [2009]). PG&E's proposed minimum streamflows (L061812-EBFSC model run) would support cooler temperatures downstream extending further into the warm summer period as compared to the flows under the existing license (base case-EBF model run) (figure 3-89 [2008] and figure 3-90 [2009]). These model runs indicate that under the proposed minimum streamflows, daily average water temperatures in South Yuba River above the Canyon Creek confluence would rarely have exceeded 20°C under 2008-2009 meteorological conditions. During particularly warm periods, however, water temperatures below the confluence of Canyon Creek could still increase to levels potentially stressful to resident rainbow trout.

To assess the effects of accretion of water from major tributaries and incremental sub-watersheds on water flow and temperature in the modeled reach of the South Yuba River, PG&E and relicensing stakeholders modeled flow characteristics in multiple stream sub-reaches of South Yuba River downstream of Lake Spaulding dam: (1) below Jordan Creek; (2) below Rucker Creek; (3) below Fall Creek; (4) below Canyon Creek; (5) below Poorman Creek; (6) below Humbug Creek; and (7) above Englebright reservoir. Minimum streamflow compliance for releases to South Yuba River from Lake Spaulding dam is measured at Lang's Crossing below the confluence of Jordan Creek (at gage YB-29); flows at this location are an aggregate of releases from the low-level outlet at Lake Spaulding dam, flows through Spaulding no. 1 powerhouse, releases through the spill channel to Jordan Creek, spills from Lake Spaulding dam, and other incremental accretion.

The Forest Service and PG&E *Supplemental Flows*, proposed in addition to the proposed minimum streamflows for South Yuba River below Lake Spaulding dam, provide an additional tool for water temperature management to support resident rainbow trout and other aquatic species. The applicant's analysis of the relationship between flow and water temperature is extensive, with bi-weekly model results from June through September. For our analysis, we use results presented for the warmest period (July 20, 2008, and July 20, 2009) in PG&E's model results. PG&E indicates that both 2008 and 2009 were relatively hot, dry weather years. Although the low-level outlet is used to meet minimum streamflow requirements, discharging water that is generally 10 to 20°C from the cold water pool in Lake Spaulding, the water temperature model clearly demonstrates the responsiveness of water temperature in South Yuba River below Lake Spaulding dam to air temperature (figure 3-89 and figure 3-90).

To evaluate the influence of flow on water temperature in this stream reach PG&E modeled discharges of 10, 20, 30, 40, and 60 cfs at Lake Spaulding dam. The model indicates that the confluence of Canyon Creek is a breakpoint in the longitudinal rise in water temperature along the South Yuba River below Lake Spaulding dam. The rate of increase in water temperature with equilibration to air temperature is greatest in the stream reach between Lake Spaulding dam and the Canyon Creek confluence, then decreases with distance downstream of Canyon Creek as water temperatures associated

with different flows converge (figure 3-91 and figure 92). In the 2009 model results, South Yuba River water temperatures at Jordan Creek are about 10°C at all five Lake Spaulding dam discharge scenarios; about 3 to 4 miles downstream in the vicinity of Rucker and Fall Creeks, water temperatures at a 10-cfs discharge have warmed about 6°C more than at the 60-cfs discharge. Below Canyon Creek, the water temperature differential between 10 and 60 cfs is about 3°C and gradually decreases to about 1°C at Lake Englebright (figure 3-91 and figure 3-92).

The influence of tributary discharges on water temperature is also apparent (figure 3-92); between Canyon Creek and Lake Englebright, tributary inflow reduces water temperature in South Yuba River by less than 1°C. Under lower discharges from Lake Spaulding dam (10 to 20 cfs), tributary inflow between Lake Spaulding dam and Canyon Creek reduces water temperature, but at higher discharges (30 to 60 cfs), tributary inflow increases water temperature in South Yuba River.

To evaluate the effectiveness of flow augmentation, PG&E ran the model at 10-cfs flow increments. The potential effect of incremental (10 cfs) increases in flow indicates that the largest temperature differential between flow increments along this reach of the South Yuba River occurs in the vicinity of the Canyon Creek confluence (figure 3-91 and figure 3-92). Total flows of 10 cfs or 20 cfs would have resulted in water temperatures above Canyon Creek in excess of 20°C on July 20 in 2009; in 2008, a flow of 20 cfs would have maintained temperatures below 20°C. The 30-cfs total flow under the Forest Service *Supplemental Flow* schedule would have ensured a water temperature of about 18°C in 2008 and about 20°C in July 2009 (figure 3-91 and figure 3-92) in the South Yuba River at Canyon Creek. Comparison of water temperatures at Canyon Creek associated with 10-cfs increments in discharge from Lake Spaulding dam between June and September (figure 3-93 and figure 3-94) indicates that at 30 cfs (maximum Forest Service *Supplemental Flow*), water temperatures in 2008 would not have exceeded 20°C (figure 3-93), but would have exceeded 20°C for several days in July 2009 (figure 3-94). For comparison, under estimated unregulated (unimpaired) flows in 2008, water temperatures in South Yuba River at Canyon Creek would have exceeded 22°C for most of the month of July and August (figure 3-95); associated estimated unregulated flows for this period would have been about 16 cfs at the beginning of July, decreasing to about 11 cfs at the beginning of August through the end of September (figure 3-95).

The *Block Flow* recommendation of California Fish and Wildlife and the Foothills Water Network establishes a management goal to maintain water temperature above the Canyon Creek confluence at 19°C or less and below 20°C above Poorman Creek to benefit coldwater species and enhance coldwater angling opportunities in areas that are more accessible downstream of Canyon Creek. The 60-cfs total *Block Flow* recommended by California Fish and Wildlife and the Foothills Water Network would have produced water temperatures in mid-July at Canyon Creek in the range of 16 to 17°C. While these temperatures could benefit resident trout, they are likely to inhibit development of foothill yellow-legged frog tadpoles in this stream reach. At a total *Block Flow* of 60 cfs, water temperatures would have rarely reached 18°C during either year.

This analysis indicates that the Forest Service *Supplemental Flow* proposal provides a mechanism for management and maintenance of water temperature at less than 20°C between Lake Spaulding dam and the confluence of Canyon Creek to benefit resident rainbow trout without jeopardizing the population of foothill yellow-legged frog. PG&E's model results indicate that maintaining the target 19°C at Canyon Creek, as proposed in the California Fish and Wildlife/Foothills Water Network *Block Flow* recommendation, rather than the target of 20°C in the Forest Service *Supplemental Flow* condition would have the potential to adversely affect foothill yellow-legged frog and hardhead as water temperatures in reaches where these species potentially reside would be reduced to a level that could inhibit natural development rates of early life stages. Furthermore, temperature modeling predicts (Amended License Application Supplement 4, Attachment 2B [January 23, 2013]) that in July and August during warm

years, the temperature differential between Canyon Creek confluence and Poorman Creek confluence could be 2 to 4°C (figure 3-94), not the 1°C assumed by California Fish and Wildlife and the Foothills Water Network. Thus, it does not appear that the Block Flow recommendation would achieve the 20°C water temperature target at Poorman Creek during warmer years. To maintain 20°C water temperature in south Yuba River at Poorman Creek would require a discharge at Lake Spaulding dam greater than 60 cfs and would result in water temperatures less than 17°C at the Canyon Creek confluence (figure 3-94), a temperature range likely to adversely affect development of foothill yellow-legged frog.

PCWA presented modeling results and biothermal information (September 14, 2012) to support the 20°C target water temperature upstream of Canyon Creek in the *South Yuba River Supplemental Flow* proposal as more appropriate for the resident aquatic community in this stream reach than the 19°C objective of the *Block Flow* proposal. According to the model results presented by PCWA, the *Block Flow* recommendation would significantly reduce water temperatures below estimated unregulated conditions (4 to 5°C in South Yuba River and 2°C in Canyon Creek), which could adversely affect the distribution and persistence of resident aquatic species, foothill yellow-legged frog in particular.

PG&E and NID filed additional operations analysis (January 23, 2013) that assessed the affect of the *Supplemental Flow* and *Block Flow* proposals on power generation and the ability of NID and PCWA to meet water delivery obligations. The analysis modeled four scenarios using proposed minimum streamflows with combinations of *Supplemental Flow* or *Block Flow* releases from Lake Spaulding dam to the South Yuba River and proposed *Block Flow* releases from Milton diversion dam to the Middle Yuba River (see next section):

- Scenario 1 – *Supplemental Flow* in South Yuba River
- Scenario 2 – *Supplemental Flow* in South Yuba River and *Block Flow* in Middle Yuba River
- Scenario 3 – *Block Flow* in South Yuba River and *Block Flow* in Middle Yuba River
- Scenario 4 – *Block Flow* in South Yuba River.

Implementing either of these flow augmentation proposals for the South Yuba River would result in a similar reduction in power generation compared to the existing license conditions; the difference between the two proposals is estimated to be less than 0.5 percent depending on water year type (table 3-194). Under these four scenarios, there were 4 years between 1976 and 2008 in which NID and/or PCWA would have been unable to meet water delivery targets: 1976, 1977, 1978, and 1989. The effects of implementing either flow augmentation proposal in the South Yuba River (scenarios 1 and 4) were greater for NID than for PCWA (table 3-195). This was particularly apparent in 1977, an extreme critically dry year. During 1977, both NID and PCWA would have been better able to meet water delivery targets under the *Block Flow* condition than under the *Supplemental Flow* condition.

The modeling results indicate that the Forest Service *Supplemental Flow* condition in combination with proposed minimum flows would enhance cold water aquatic habitat, maintaining water temperatures in the South Yuba River that could be about 3 to 5°C below what might be expected under unregulated conditions (figures 3-93 to 3-95). Water temperatures in the stream reach of the South Yuba River between Lake Spaulding dam and the confluence of Canyon Creek would remain at or below 20°C except for a few days even during warm years. The *Block Flow* proposal from California Fish and Wildlife would provide water temperatures several degrees cooler than the *Supplemental Flow* condition, which would further enhance aquatic habitat for resident trout farther downstream, but would have the potential to adversely affect development and abundance of the special status species foothill yellow-legged frog. We find that implementation of the *Supplemental Flow* condition is likely to benefit to aquatic resources overall; whereas, the *Block Flow* recommendation is likely to enhance conditions for

coldwater resident trout and the recreational anglers, but has the potential to put populations of foothill yellow-legged frog at risk in this stream reach of the South Yuba River. The monitoring plan proposed by PG&E (section 3.3.2.2.8, *Aquatic Biota*) would include sampling the aquatic community, including foothill yellow-legged frog, and monitoring water temperature in this stream reach. The results of monitoring would provide data to evaluate the effect of the *Supplemental Flow* increase on foothill yellow-legged frog population abundance and distribution.

Yuba-Bear Project (Bowman Development) – Middle Yuba River Below Milton Diversion Dam

NID proposes significant increases in minimum streamflows for the Middle Yuba River below the Milton diversion dam (section 3.3.2.2.2, *Instream Flows*) compared to the existing license; the proposed minimum flows are higher than flows estimated under unregulated conditions from mid-summer through fall. California Fish and Wildlife (recommendation 2.8) and the Foothills Water Network recommend measures (referred to as the *Block Flow* recommendation) that would further augment flow above proposed minimum streamflows during summer to manage water temperatures and enhance aquatic habitat in Middle Yuba River below Milton diversion dam. Their recommendation also includes installation of water temperature telemetry and data logging equipment in Middle Yuba River in the vicinity of Wolf Creek and National Gulch to monitor the response of water temperature to *Block Flow* releases. NID does not propose a measure to manage water temperatures with flow augmentation above minimum streamflows proposed for Middle Yuba River. In its letter replying to comments (September 14, 2012), NID rejects the *Block Flow* recommendation as very complex, costly, and excessive given the substantial enhancements proposed for this stream reach, including increased minimum streamflows and spill cessation schedules (section 3.3.2.2.2, *Instream Flows*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*).

California Fish and Wildlife recommended that, during all water year types, NID allocate a “Block of Water” not to exceed 2,500 acre-feet to maintain Middle Yuba River water temperature at RM 26.9 immediately upstream of the Wolf Creek confluence (about 18 miles downstream from Milton diversion dam) at 19°C between June 15 and September 15. The measure includes a condition to further augment flows when air temperatures are forecasted to exceed 32°C for 2 or more days during the following 7 days. *Block Flow* releases from Jackson Meadows dam and/or Milton diversion dam would be made in 5- to 10-cfs increments at least 8 hours apart up to a total of 30 cfs to manage water temperature. In addition to these *Block Flow* releases, Foothills Water Network proposes a reduction of minimum streamflows by 5 to 10 cfs in April and May during below normal and above normal years to offset the effect of the *Block Flow* increase on project power generation. Foothills Water Network estimates that this change would yield an overall annual increase in power generation compared to the NID and Forest Service minimum streamflow measure.

This *Block Flow* schedule would be similar to the range to flows recommended by NMFS (table 3-152) to support reintroduction of Central Valley steelhead to Middle Yuba River (section 3.3.2.2.2, *Instream Flow*). During the summer, the minimum streamflows proposed by NID would range from 6 to 15 cfs in critically dry years to 15 to 40 cfs in wet years, depending on month; the *Block Flow* recommendation would generally increase flows by 2 to 5 times the proposed minimum streamflows during drier periods. The *Block Flow* measure also proposes that NID create a Water Temperature Operations Group composed of representatives of NID, PG&E, the Forest Service, California Fish and Wildlife, BLM, California Water Board, and two non-governmental organizations to be determined. This Operations Group would provide recommendations for water temperature management on a monthly basis during the *Block Flow* period and would meet at least once annually in May to review and discuss program results and information.

Our Analysis

Cold water habitat in the Middle Yuba River is maintained by low-level releases from Jackson Meadows Lake dam and Milton diversion dam (Bowman Development) and supports a recreational fishery for resident rainbow trout. Temperature modeling results presented by NID for the Middle Yuba River (Amended License Application Supplement 3, Attachment 2B [August 17, 2012]; Longitudinal Temperature Attachment [January 23, 2013]) provide analysis of the relative effects of different flow releases at Milton diversion dam on downstream water temperatures in the Middle Yuba River based on weather conditions that occurred during 2008 and 2009, which were warm, dry years. During summer, water temperatures in the Middle Yuba River gradually warm with distance downstream and equilibration with ambient air temperatures (figure 3-96 [2008] and figure 3-97 [2009]). Daily average water temperature determined during these monitoring programs at Wolf Creek (RM 26.9) exceeded 20°C for a few days in mid-July and mid-August in 2008 and a few days in late July in 2009; at East Fork Creek (RM 34.6), water temperatures did not exceed 15°C in either year. Flows during these monitoring periods were generally about 5 to 7 cfs (figure 3-96 and figure 3-97). The California Fish and Wildlife and Foothills Water Network *Block Flow* recommendation establishes a management goal to maintain water temperature above the Wolf Creek confluence at 19°C or less to benefit coldwater species and increase coldwater angling opportunities in more accessible areas farther downstream in Middle Yuba River.

NID rejects the need for *Block Flow* augmentation in Middle Yuba River given the proposed minimum streamflows, which are significantly higher (4 to 6 cfs in extreme critically dry years; 6 to 20 cfs in critically dry years; up to 10 to 70 cfs in wet years) than existing conditions (3 cfs year round in all years). NID also raised concerns related to the effect on foothill yellow-legged frog from a reduction of the management target water temperatures to 19°C.

NID performed extensive analysis of the relationship between flow and water temperature in bi-weekly time steps under weather conditions during 2008 and 2009. For our analysis, we have used results presented for the warmest model period (July 20, 2008, and July 20, 2009). NID indicates that both years were relatively hot, dry weather years, although 2008 was more moderate. Because storage and residence time in the Milton diversion dam impoundment is very small, increased releases to Middle Yuba River below the diversion dam would be accomplished primarily by increasing releases from Jackson Meadows dam. The low-level outlets at Jackson Meadows dam and Milton diversion dam are used to meet minimum streamflow requirements, discharging water that is generally 10 to 20°C from Milton diversion dam impoundment. Proposed minimum streamflows for July and August would be 4 to 20 cfs and 4 to 15 cfs, respectively, depending on water year type.

The influence of tributary discharges on water temperature is also apparent (figure 3-98 and figure 3-99); at 3 cfs, tributary inflow reduces water temperature in Middle Yuba River by about 1°C. Under higher discharges from Jackson Meadows dam, inflow from East Fork Creek and Wolf Creek reduces water temperature.

To evaluate the influence of flow on water temperature in this stream reach, PG&E modeled discharges of 3, 25, 50, 75, 100, and 150 cfs at Jackson Meadow dam. The model indicates that the increase in water temperature in the Middle Yuba River between Milton diversion dam and Our House reservoir is virtually linear at flows of 50 cfs or greater; at lower flows (3 to 25 cfs), the rate of temperature increase is greater in the upstream portion of the stream reach, with a breakpoint between East Fork Creek and Wolf Creek (figure 3-98 and figure 3-99). The potential effect of incremental flow augmentation indicates that the largest temperature differential between a 3-cfs and 50-cfs discharge from Milton diversion dam occurs in the vicinity of the East Creek confluence (figure 3-98 and figure 3-99). A streamflow of 3 cfs would have resulted in a water temperatures greater than 20°C above Wolf Creek (figure 3-100) during mid-July to early August 2009 and generally below 18°C above East Fork Creek

(figure 3-101) during the same period. In 2008, a flow of 20 cfs would have maintained temperatures below 20°C. A 25-cfs discharge from Milton diversion dam would result in a water temperature generally below 18°C at Wolf Creek and 15°C at East Fork Creek in 2009 (figure 3-100 and figure 3-101). The potential 30-cfs total *Block Flow* proposed by California Fish and Wildlife and the Foothills Water Network would further reduce water temperatures in this stream reach in mid-July.

Although the temperatures estimated by the model could enhance aquatic habitat conditions for resident trout in the Middle Yuba River below Milton diversion dam, they have the potential to adversely affect development of foothill yellow-legged frog tadpoles in this stream reach. Foothill yellow-legged frogs were observed during relicensing surveys upstream from Our House reservoir to about RM 30, between Wolf Creek and East Fork Creek.

PCWA (September 14, 2012) asked the Commission to reject the *Block Flow* recommendation proposed by California Fish and Wildlife and the Foothills Water Network because (1) the proposed temperature criteria are inappropriate and would potentially reduce preferred habitat and jeopardize special status species including foothill yellow-legged frog and hardhead; and (2) increased discharges would also increase power generation losses and water supply deficits. PCWA presents modeling results and biothermal information to support a 20°C target water temperature in the Middle Yuba River as more appropriate for the resident aquatic community than the 19°C objective in the *Block Flow* proposal. According to the model results presented by PCWA, the *Block Flow* recommendation would reduce water temperatures 1°C below estimated unregulated conditions in Middle Yuba River, which could adversely affect the distribution and persistence of resident aquatic species, foothill yellow-legged frog in particular.

PCWA (September 14, 2012) presents an analysis that indicates that about 4 miles of the Middle Yuba River above Wolf Creek would be lost as foothill yellow-legged frog habitat if the *Block Flow* proposal (with a 19°C water temperature objective above the confluence of Wolf Creek) were implemented as a result of reduced water temperatures in this stream reach (figure 3-102). PCWA also points out that the proposed change in water temperature regime associated with the *Block Flow* proposal has the potential to alter the periphyton algae-based food web on which foothill yellow-legged frog rely. Seasonal blooms of periphyton are dependent on stable flow conditions, increasing day light, and warming temperatures during the mid-summer dry season. PCWA indicates that slowing or delaying the seasonal increase in water temperature in the stream reach above Wolf Creek could affect seasonal succession and species composition of the algae and diatoms in the periphyton community, which in turn determines the food quality for consumers (Furey et al., 2012) such as foothill yellow-legged frog tadpoles. The temperatures for optimal growth of tadpoles in the stream reach may no longer coincide with the availability of high quality food resources.

Our analysis indicates that the proposed minimum streamflows (section 3.3.2.2.2, *Instream Flows*) for the Middle Yuba River below Milton diversion dam are likely to ensure maintenance of water temperature at less than 20°C between Milton diversion dam and the confluence of Wolf Creek, which would benefit resident rainbow trout without jeopardizing the population of foothill yellow-legged frog. It is likely that 20°C would be a more appropriate management goal for the Middle Yuba River above Wolf Creek for balancing aquatic resource needs; maintaining 20°C at Wolf Creek would likely maintain adequate temperatures for foothill yellow-legged frog in the vicinity of their upstream extent near RM 30.

PG&E and NID filed additional operations analysis (January 23, 2013) that assessed the affect of the *Supplemental Flow* and *Block Flow* proposals on power generation and the ability of NID and PCWA to meet water delivery obligations. The analysis modeled four scenarios using proposed minimum streamflows with combinations of *Supplemental Flow* or *Block Flow* releases from Lake Spaulding dam to the South Yuba River and proposed *Block Flow* releases from Milton diversion dam to the Middle Yuba River (see next section):

- Scenario 1 – *Supplemental Flow* in South Yuba River
- Scenario 2 – *Supplemental Flow* in South Yuba River and *Block Flow* in Middle Yuba River
- Scenario 3 – *Block Flow* in South Yuba River and *Block Flow* in Middle Yuba River
- Scenario 4 – *Block Flow* in South Yuba River.

Implementing the *Block Flow* proposal for the Middle Yuba River in conjunction with the *Supplemental Flow* schedule in the South Yuba River (scenario 2) would result in a similar reduction in power generation relative to the existing license conditions as the other scenarios; the difference between the two proposals is estimated to be less than 0.5 percent depending on water year type (table 3-194). Under these four scenarios, there were 4 years between 1976 and 2008 in which NID and/or PCWA would have been unable to meet water delivery targets: 1976, 1977, 1978, and 1989. The effects of implementing any of these scenarios were greater for NID than for PCWA (table 3-195). This was particularly apparent in 1977, an extreme critically dry year. During 1977, PCWA would have been better able to meet water delivery targets under the *Supplemental Flow* condition than under the *Block Flow* condition.

In its proposal, Foothills Water Network (August 31, 2012) critiqued the Forest Service minimum flow conditions as overly focused on the upper stream reach above Wolf Creek “[r]ather than seeking to protect and enhance the remarkably good quality trout fishery near Wolf Creek.” However, the California Fish and Wildlife and Foothills Water Network proposal would further enhance the good quality conditions for trout by suppressing water temperatures in the Middle Yuba River between Milton diversion dam and the confluence of Wolf Creek to the potential detriment of inhibiting development of early life stages of foothill yellow-legged frog.

The rationales presented for the *Block Flow* recommendation and 19°C target water temperature by California Fish and Wildlife and the Foothills Water Network contain assumptions and associated estimates of the potential effect of the additional coldwater releases on foothill yellow-legged frog populations in the Middle Yuba River that are not consistent with model results provided by NID and PCWA. The additional flows dedicated to further reducing water temperature in the stream reach from 20°C to 19°C above Wolf Creek confluence would result in an uncertain and potentially adverse effect on various aquatic resource species at the expense of project operations. According to the stakeholders the existing trout fishery is of “remarkably good quality” under the existing license conditions and proposed increased minimum streamflows are likely to improve and enhance existing conditions; however, while the *Block Flow* condition further benefits resident rainbow trout in reaches farther downstream, it could adversely affect foothill yellow-legged frog in stream reaches where viable populations have been identified. In addition, the water temperature model indicates that the *Block Flow* proposal would reduce water temperatures below what would be expected under unregulated conditions. Monitoring of the effects on resident species of concern, if the NID and Forest Service proposed minimum streamflows are implemented, would provide data necessary to evaluate and document the benefits of increased minimum streamflows and ensure that foothill yellow-legged frog populations are not adversely affected.

Effect of Increased Releases for Minimum Flows on Reservoir Coldwater Storage

Cold water is a limited, managed resource within project-affected stream reaches. Most of the water stored and transferred through project infrastructure is accumulated as snowfall during the winter. The amount of snowpack and the rate and timing of snowmelt affect the amount of cold water retained in storage, available for release downstream, and diverted across sub-basins. The ability to comply with minimum streamflows and meet water temperature objectives for coldwater habitat in project-affected

stream reaches requires careful balancing of storage, release, and diversion across both projects, which has been simulated by the operations and temperature models developed by PG&E and NID.

Drum-Spaulling Project

PG&E, the Forest Service, BLM, and California Fish and Wildlife have proposed conditions that would significantly increase the release of water from the coldwater pool of several project reservoirs (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.2, *Instream Flow, Fordyce Lake Drawdown*). The timing and rate of the increased releases would affect the volume and temperature of available stored cold water in project reservoirs and the ability of project-affected stream reaches to remain in compliance with water temperature criteria.

Our Analysis

PG&E modeled water temperature using the CE-QUAL-W2 model for Fordyce Lake and Lake Spaulding in the Drum-Spaulling Project (Spaulding No. 1 and No. 2 Development). The models were compared to observed data collected during water temperature monitoring surveys conducted in summer and fall of 2008 and 2009 (figure 3-96 and 3-97), which were relatively warm, dry years.

The majority of project reservoirs and project-affected stream reaches have good water quality and temperatures that meet coldwater habitat temperature criteria and support coldwater fisheries, particularly in portions of the project at higher elevations. Larger lakes and reservoirs (e.g., Fordyce Lake and Lake Spaulding) exhibit strong seasonal stratification; the hypolimnetic cold water pool in these lakes and low-level release structures maintain coldwater habitat in downstream reaches throughout the summer in most years. Smaller diversion impoundments and powerhouse forebays and afterbays typically have much lower storage capacity, shorter residence times, and weak to no thermal structure during summer months (technical memorandum 2-2), thus limiting their utility for downstream water temperature management. Project-affected stream reaches at lower elevations, including the South Yuba River below Canyon Creek and the Deer Creek sub-basin, have daily average and maximum water temperatures that routinely exceed 20°C in mid-summer (technical memorandum 2-2) under the existing license, which can provide transitional habitat supporting a mix of cold and cool water species.

PG&E conducted a study (*Spaulding Power Intakes Variable Operations Analysis*, technical memorandum 2-2) to evaluate how the depth at which Spaulding no. 1 and no. 2 powerhouses withdraw water affects water temperatures in the South Yuba and Drum canals and temperature stratification in Lake Spaulding (the largest project storage facility). The effects of associated changes in coldwater storage extend to downstream reaches in Deer Creek, South Yuba River, Bear River, Auburn Ravine, and Mormon Ravine. During normal operations under the existing license, water withdrawal to supply the Spaulding no. 1 and no. 2 powerhouses is distributed and balanced between the upper and lower intake towers. The study demonstrated that water withdrawal from only the shallow powerhouse intake preserves the hypolimnetic cold water pool, but sends warmer water to Deer Creek via the South Yuba and Chalk Bluff canals and to the Bear River via the Drum and South Yuba canals. Primary use of the low level powerhouse intakes releases water about 2°C cooler to the canals, but depletes the Lake Spaulding cold water pool more rapidly.

Coldwater releases to meet proposed minimum streamflows in South Yuba River would be made from the cold water pool via the low-level outlet (elevation about 8,775 feet msl, about 65 feet deeper than the low-level powerhouse intake); *Supplemental Flow* releases could also be made through the low-level outlet, but could be partially made via the Spaulding no.2 powerhouse. Water temperature profiles in mid-August to early September indicate that the low-level outlet is about 60 to 70 feet deeper than the thermocline and would release water to South Yuba River at a temperature range of 6 to 7°C (technical memorandum 2-2).

Based on field characterization of the thermal structure of Lake Spaulding and temperature modeling of flow releases to South Yuba River from the Lake Spaulding cold water pool, the cold water pool is generally adequate to maintain temperatures less than 20°C through the summer in South Yuba River to the confluence of Canyon Creek and to meet the goals for management of coldwater habitat (figures 3-103 through 3-106). As the summer season progresses and the cold water pool is reduced and becomes warmer in the vicinity of the low-level outlet in Lake Spaulding, downstream water temperatures begin to approach 20°C, particularly during extended periods with high regional air temperatures.

Model results indicate that the proposed measure to drawdown Fordyce Lake more rapidly in late spring and summer with higher flows to Fordyce Creek would help maintain higher water surface elevations in Lake Spaulding longer into the summer than under the existing license. The seasonal reduction in coldwater storage in Fordyce Lake and Lake Spaulding and seasonal variation in outlet water temperatures associated with the proposed minimum streamflows is demonstrated by model results based on water years 2008 to 2009 (figures 3-103 through 3-106); this model run did not include the proposed *Supplemental Flows* above the proposed minimum streamflows to South Yuba River, but did include a buffer of 2 cfs to ensure minimum streamflow compliance. Water cooler than 10°C in Lake Spaulding is depleted at the low-level outlet by the beginning of August, and the majority of remaining storage is between 15 and 20°C by September 1. The proposed *Supplemental Flows* would likely accelerate the depletion of the coldwater pool in Lake Spaulding, which could affect the ability to maintain late season downstream water temperatures below 20°C.

The model indicates that implementation of *Supplemental Flow* releases during 2008 and 2009 would have maintained water temperatures within 1 mile below Lake Spaulding dam below 15°C until about September 1; water temperatures would have peaked at about 16 to 17°C in mid-September (figures 3-103 and 3-104). About 8 miles downstream, above the Canyon Creek confluence, mean daily water temperatures would have remained below 20°C for both 2008 and 2009 water year conditions. The model predicts that implementation of the South Yuba River *Supplemental Flows* condition in addition to the proposed minimum flow schedule would result in reduction of the cold water pool earlier in the season, but would support the management objective of maintaining summer water temperatures at or below 20°C in the vicinity of Canyon Creek.

Yuba-Bear Project

NID and the Forest Service proposed measures and conditions that would significantly increase the release of water from the coldwater pool of several project reservoirs (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*). The timing and rate of the increased releases would affect the volume and temperature of available stored cold water in project reservoirs and the ability of project-affected stream reaches to remain in compliance with water temperature criteria.

Our Analysis

NID modeled water temperature using the CE-QUAL-W2 model for Jackson Meadows reservoir, Bowman Lake, and Rollins reservoir in the Yuba-Bear Project to assess the effect of proposed increased minimum streamflows on coldwater storage and the ability to meet downstream water temperature management objects. NID used the Hydrocomp Forecast and Analysis Modeling (HFAM) water temperature model for Middle Yuba River downstream of Jackson Meadows dam and Milton diversion dam and for Canyon Creek downstream of Bowman-Spaulding diversion dam and the confluence with Texas Creek. NID also used the USGS Stream Segment Temperature (SSTEMP) to model the Bear River downstream of Drum afterbay, Dutch Flat afterbay, and the Bear River canal diversion dam. The models

were compared to observed data collected during the water temperature monitoring surveys conducted by the applicants in summer and fall of 2008 and 2009 (relatively warm, dry years).

The majority of project reservoirs and project-affected stream reaches have good water quality and temperatures that meet coldwater habitat temperature criteria and support coldwater fisheries, particularly in portions of the project at higher elevations. Larger lakes and reservoirs (e.g., Jackson Meadows reservoir and Bowman Lake [Bowman Development] and Rollins reservoir [Rollins Development]) exhibit strong seasonal stratification; the hypolimnetic cold water pool in these lakes and low-level release structures maintain coldwater habitat in downstream reaches throughout the summer in most years. Smaller diversion impoundments and powerhouse forebays and afterbays typically have much lower storage capacity, shorter residence times, and weak to no thermal structure during summer months (technical memorandum 2-2). Consequently, these smaller project facilities generally have less flexibility for flow and temperature management in downstream reaches. Project-affected stream reaches at lower elevations, including the Middle Yuba River below the Wolf Creek confluence and Canyon Creek upstream of the South Yuba River, have summer daily average water temperatures that can exceed 20°C in mid-summer (technical memorandum 2-2) under the existing license and may provide transitional habitat supporting a mix of cold and cool water species.

Coldwater releases from Bowman-Spaulding diversion dam to Canyon Creek would be made from the coldwater pool of Bowman Lake via the low-level outlet at 5,400 feet msl to comply with minimum streamflows, flow cessation, and flow augmentation, as necessary. The thermocline in Bowman Lake is relatively broad in August, with water temperature decreasing from 18°C to 10 to 12°C over 100 feet (i.e., from a depth of 60 to 160 feet) (technical memorandum 2-2, *Water Temperature Monitoring*). Water temperatures at the low-level outlet during August varied among years sampled (2004, 2007, 2008, and 2009) between 10°C and 13°C. Water temperatures in Canyon Creek below the Bowman-Spaulding diversion dam are generally below 15°C except from mid-August to mid-September when temperatures increase to 16 to 17°C (technical memorandum 2-2). Above the confluence with South Yuba River 19.6 miles downstream, the model predicts that water temperatures would be 3 to 12°C warmer than temperatures below Bowman-Spaulding diversion dam from early May to early September. Model-estimated peak daily average water temperatures at the downstream location exceed 20°C for a portion of the time between early July and early September.

Water temperature in Middle Yuba River below Milton diversion dam is essentially controlled by coldwater storage in Jackson Meadows reservoir and flow release to Milton diversion dam, which has negligible storage capacity. Modeling based on the 2008 and 2009 water years indicates that water temperature at the low-level outlet at Jackson Meadows dam would be less than 10°C through September 1 (figures 3-105 and 3-106). Water temperatures in Middle Yuba River downstream of the Milton diversion dam are responsive to fluctuations in air temperature, but would remain below 15°C until mid-September and below 20°C above the Wolf Creek confluence through the summer, except for short periods, under NID's proposed minimum streamflows.

Water temperatures in lower Canyon Creek are controlled by flow release from Bowman Lake dam into the Bowman-Spaulding diversion dam. Under the proposed minimum flows, the low-level outlet at Bowman Lake dam would release water less than 10°C until the beginning of August; after mid-August, the cold water pool would be reduced and water temperature in Bowman Lake in the vicinity of the low-level outlet would be 15 to 20°C (figures 3-107 and 3-108). Water temperatures in the 10.5-mile downstream reach of Canyon Creek to the South Yuba River would remain below 20°C for most of the summer (figures 3-107 and 3-108).

Water temperatures in lower Bear River are controlled by flow release from Rollins reservoir dam into the Bear River canal diversion dam. Under the proposed minimum streamflows the model indicates

that the low-level outlet at Rollins reservoir dam would release water from 10 to 15°C until the beginning of August; thereafter, the cold water pool would be reduced, and water temperature in Rollins reservoir in the vicinity of the low-level outlet would be 15 to 20°C (figures 3-109 and 3-110). Water temperatures in the 10.4-mile downstream reach of Bear River to Lake Combie would remain below 20°C for most of the summer (figures 3-109 and 3-110).

Based on field characterization of the thermal structure of Jackson Meadows reservoir, Bowman Lake, and Rollins reservoir and temperature modeling of flow releases to Middle Yuba River, Canyon Creek, and the lower Bear River from the respective cold water pools, the cold water pools in these project waters would generally be adequate to maintain temperatures less than 20°C through the summer and meet the goals for management of coldwater habitat. As the summer season progresses and the cold water pools are reduced, water in the vicinity of the low-level outlets becomes warmer and downstream water temperatures begin to approach 20°C, particularly during extended periods of hot weather. The model predicts that implementation of the proposed minimum streamflow releases from these larger Yuba-Bear reservoirs would result in reduction of the cold water pool earlier in the season, but would support the management objective of maintaining summer water temperatures at or below 20°C target temperature in the downstream project-affected stream reaches.

Effect of Project Operations on Mercury Transport and Bioaccumulation

Many Sierra Nevada streams, including some project-affected stream reaches, have a legacy of mercury contamination, particularly in stream sediment and fish tissue that have the potential to be affected by project operations. Elevated methylmercury concentrations in fish tissue have been reported throughout the Sierra Nevada region, most frequently linked to historical gold mining activities. The monitoring plan specified in Forest Service condition 35 and recommended in California Fish and Wildlife recommendation 8 for both projects would include periodic monitoring of mercury bioaccumulation in fish tissue from stream reaches of interest. The agencies provide no detail on the objectives of this monitoring effort, monitoring frequency, or stream reaches to be monitored. PG&E and NID observed that the relicensing bioaccumulation study confirmed what numerous studies performed by university and state researchers found previously: mercury is present in the subwatersheds and bioaccumulates through the food chain. Based on the existing high water quality and sufficient existing bioaccumulation data, PG&E and NID state that additional monitoring of mercury bioaccumulation would provide no useful new information.

Our Analysis

PG&E and NID collected information on the frequency and magnitude of mercury contamination in fish tissue in project-affected stream reaches. Of the 66 fish collected for relicensing studies, 52 had mercury concentrations in fillet tissue greater than the California Office of Environmental Health Hazard Assessment (OEHHA) Advisory Tissue Level (ATL) of 0.07 parts per million (ppm) methylmercury wet-weight: (1) 19 of the 31 rainbow trout; (2) 24 of the 26 brown trout; and (3) all of the kokanee and Chinook salmon. Fish tissue was collected for analysis of methylmercury concentrations in five reservoirs: Jackson Meadows reservoir and Bowman Lake in the Bowman Development of the Yuba-Bear Project and Faucherie Lake, Fordyce Lake, and Lake Spaulding in the Spaulding No. 1 and No. 2 Development of the Drum-Spaulding Project. Of the five reservoirs and four species (rainbow and brown trout, kokanee, and Chinook salmon) sampled, tissue concentrations were below the ATL only for rainbow trout collected from Bowman Lake. A majority of individual fish in all other reservoir-species combinations had methylmercury concentrations greater than the ATL, as well as average tissue concentrations greater than the ATL.

The Bear River from Rollins reservoir to Lake Combie, including Rollins reservoir, is listed under §303(b) for mercury impairment (technical memorandum 2-1), and OEHHA has issued fish

ingestion advisories in these two reservoirs (OEHHA, 2003; California Water Board, 2006; OEHHA, 2009). Fish ingestion advisories for South Yuba River below Lake Spaulding and for the section of the Bear River between Rollins reservoir and Lake Combie have been retracted (OEHHA 2009) because the data were inadequate for a determination of risk.

While elevated methylmercury levels in fish tissue associated with historical mining activities have been reported throughout the Sierra Nevada region, PG&E and NID propose no significant changes to project operations that would affect methylmercury concentrations in sediment, water, or fish tissue in the project area. No programs to mitigate widespread historical mercury sources in these watersheds are anticipated. Methylmercury concentrations in fish tissue are likely to remain high in the future with all other factors affecting uptake remaining unchanged. Therefore, we do not expect any changes in methylmercury concentrations in the environment or in the tissue of target sportfish as a result of project operations. Monitoring fish tissue from selected stream reaches (e.g., where specific historical mining concerns have been identified and heavy recreational fishing pressure exists) could provide data useful to OEHHA for determining the need for consumption advisories, but such efforts would not be warranted by project operations. Given the ubiquitous nature of elevated mercury in fish tissue from lakes and reservoirs in the region and the existing consumption advisories, additional monitoring of fish from project lakes/reservoirs would likely provide little new information to guide decisions relative to consumption advisories.

3.3.2.2.8 Aquatic Biota

Drum-Spaulding Project

Protection of Fish in Project Canals

The existing project canal intakes are not screened to exclude entry by resident fish and any fish that enter the canals are at risk when the canals are drained during an outage. When a canal is dewatered during routine planned and unplanned maintenance and emergency outages, fish can become stranded in the canal as water levels drop. To minimize potential mortality to fish during outages, PG&E proposes (DS-AQR2) to implement a canal fish rescue plan, the *Fish Protection and Management During Canal Outages Plan*. The plan affects facilities associated with the Drum No. 1 and No. 2 Development, Alta Development, Deer Creek Development, Halsey Development, Wise and Wise No. 2 Development, and Newcastle Development. The Forest Service (condition 30) and BLM (condition 5) specify and California Fish and Wildlife (recommendation 3) recommends that PG&E develop a plan in coordination with the agencies within the first year following license issuance.

PG&E's draft plan describes the canal facilities (table 3-196) and locations where fish management and response actions would be implemented at the time of an outage; maps identify the type of facility (e.g., flume, canal, tunnel) and access points. The plan also describes the periods when outages are most likely to occur at each facility and outlines the procedures that would be implemented for drawdown of these water conveyance structures and for fish management and protection. The plan also includes protocols for agency notification and consultation during these events and for annual planning.

Our Analysis

The plan submitted by PG&E provides a comprehensive approach for communication and planning and for implementation of protocols to collect and relocate, as necessary, fish that are stranded in a canal when the canal is taken out of service for maintenance or in the event of an emergency. The plan as filed describes effective measures that would be protective of aquatic resources within the project canals. Following review and approval by the agencies, the plan would be included in the license and implemented within 90 days of license issuance.

Reservoir Management Effects on Aquatic Biota

The increased minimum streamflows, spill cessation schedules, and supplemental flows for water temperature management and recreational boating (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*; section 3.3.5.2, *Recreation Resources*) could result in earlier and larger drawdown of some project lakes/reservoirs, potentially affecting shallow water lake habitat, important juvenile-rearing habitat for many species, as well as recreational access and use of reservoir facilities. Many of the larger lakes/reservoirs are managed for and receive heavy recreational fishing pressure; annual stocking is a key component of California Fish and Wildlife's recreational fishery management program. Although natural reproduction occurs in some of these project waters, stocking is necessary to sustain populations of game fish in waters with high angler usage.

PG&E proposes (DS-AQR3) to stock Lake Spaulding. Forest Service recommendation 6 and California Fish and Wildlife recommendation 17 recommend a fish stocking program to support recreational fishing that includes 16 lakes that are part of the Drum-Spaulding Project in addition to Lake Spaulding. Many of these additional lakes are small, more remote, high elevation waters. We analyze these conflicting stocking proposals in more detail in section 3.3.5.2, *Recreation Resources*.

Monitoring of Fish Populations in Project-Affected Stream Reaches

PG&E proposes several measures to improve flows and maintain water temperatures in project-affected stream reaches below project dams and diversions to improve aquatic habitat and enhance aquatic resources (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*). PG&E did not propose continued monitoring in these project stream reaches in its Final License Application.

The Forest Service (condition 35) specifies and California Fish and Wildlife (recommendation 8) recommends monitoring the stream fish community in large rivers and streams and small, higher elevation headwater streams; species composition, abundance, biomass, size and age structure, and relative stock density would be analyzed. PG&E's alternative to the Forest Service condition proposes to implement the Aquatic Monitoring Plan filed by PG&E (August 30, 2012), which focuses on larger stream reaches where increased flow and anticipated cooler water temperature are most likely to affect aquatic resources under the new license conditions. The Forest Service did not comment on PG&E's alternative to their condition 35.

Stream reaches proposed in PG&E's monitoring plan include: (1) two stream reaches of South Yuba River downstream of Spaulding No. 1 and No. 2 Development; (2) two stream reaches of Fordyce Creek below Fordyce dam (Spaulding No. 1 and No. 2 Development); (3) three stream reaches in the Bear River upstream of Drum afterbay (Drum No. 1 and No. 2 Development); and (4) one stream reach each below Lake Valley reservoir dam and the Lake Valley canal diversion dam (Drum No. 1 and No. 2 Development). PG&E does not propose to monitor fish populations in any small, higher elevation headwater streams, because these stream reaches have limited additional water resources and would, under unregulated conditions, be seasonal streams that are partially or completely dry during mid-summer and fall.

PG&E would perform the monitoring with the same methods (electrofishing and snorkeling) used during relicensing studies and it would focus on resident rainbow trout. Monitoring would be conducted during the first 2 years following license issuance and subsequently in years 5, 6, 9 and 10; after year 10, PG&E and the agencies would collaboratively evaluate the results and make a determination on the need for and magnitude of continued stream fish monitoring.

Our Analysis

Changes in monthly minimum streamflows, spill cessation schedules, and supplemental South Yuba River releases, which we discuss in depth previously, are key measures designed to protect, maintain, and enhance aquatic habitat for resident species in project-affected stream reaches. The flow enhancements in many stream reaches vary seasonally and are based on water year type, and they are balanced against associated costs in reduced power generation and risk to water delivery, particularly during exceptionally dry conditions. An aquatic monitoring program would provide a mechanism for evaluating the benefit of the project's operational changes and assessing if they are accomplishing the intended objectives predicted by the habitat and operations models.

Annual review of program results during the annual consultation process would involve the resource agencies in assessing the success of the proposed flow conditions and provide a process for adjusting the monitoring program, if needed.

Relicensing studies and statistical estimation of unregulated hydrology indicate that many of the small, higher elevation stream reaches are seasonal, becoming dry or almost dry during late summer in many years, and are supporting limited opportunistic aquatic resources. Waters in the upper watershed with more permanent flow conditions support coldwater fish communities dominated by or exclusively resident rainbow and/or brown trout. Fish generally exhibit good condition factors and a mix of year classes. PG&E's *Stream Fish Population* (technical memorandum 3-1) report indicates that "stream fish were in good condition. Fish exhibited robust bodies; were free of visible disease, parasites, and lesions; possessed reasonable growth rates for the region; and exhibited normal behavioral patterns. Multiple age classes of fish were collected at most Level II sites, indicating regular recruitment of juvenile fish to these populations." In some waters, age 0 trout are uncommon, which may indicate that the population in the stream reach is supported primarily by stocking or migration of fish into the stream reach. An assemblage of trout and cool water cyprinid species was found at lower elevations with accretion of slightly warmer flow.

The stream fish monitoring plan proposed by PG&E targets several stream reaches most likely to benefit from proposed increased minimum streamflows and anticipated decreases in water temperature and improvements in aquatic habitat. The proposed stream reaches were previously surveyed during the relicensing studies; use of the same methods would provide a before and after comparison of stream populations. The proposed plan would provide intermittent surveys during 6 of the first 10 years following license issuance, which should be adequate to depict community changes and trends in these stream reaches. At the end of this period, an evaluation of the population trends and habitat conditions over the 10-year period would provide a basis for assessing the adequacy and benefits of the environmental measures and making a determination if monitoring should be continued or modified moving forward.

For many of the small, higher elevation headwater streams, the proposed minimum flow measures will ensure flows year round in these stream reaches, which are often dry late in the summer under existing conditions, particularly during drier years. Introduction of permanent, although low minimum flows to these stream reaches would have a limited effect on resident coldwater fish assemblages; however, the permanent inundation of portions of the channel could result in improved conditions for benthic macroinvertebrates (see section on benthic macroinvertebrates below). Long-term monitoring of these stream reaches would likely not generate data that would be useful for making future project water management decisions.

Effect of Operations on Aquatic Habitat in Project-Affected Stream Reaches

The quantity and quality of aquatic habitat are affected by project operations, including the influence of flow, wetted perimeter, magnitude and frequency of inundation, availability and dispersal of LWD, and distribution and characteristics of sediment/substrate. The objectives of various measures proposed by PG&E and recommended by relicensing stakeholders are to improve aquatic habitat conditions for resident aquatic biota compared to existing conditions. We discuss the anticipated enhancements of aquatic habitat as a result of proposed minimum streamflows and flow management previously (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*).

Reservoir operations and regulated flows have the potential to alter two key components of habitat for aquatic resources: (1) the availability of LWD in downstream reaches; and (2) the characteristics and distribution of substrate material in streams. LWD can provide cover, affect habitat diversity, and contribute to diversity of channel morphology and substrate; under the existing license, this material is removed from reservoirs as needed and stockpiled or burned. The Forest Service (condition 36) specifies and California Fish and Wildlife (recommendation 9) recommends a project-wide LWD management program, including survey of locations and quantity of LWD collected under the existing license and identification of appropriate locations downstream of project dams for reintroduction of LWD that would be mobilized during 2- and 5-year flow events. PG&E's alternatives (August 30, 2012) to Forest Service conditions indicate its concurrence with the revised Forest Service condition 36; that concurrence would include the development and implementation of an LWD management plan.

NMFS 10(j) (recommendations 4.2.1 and 4.2.2) and FWS (recommendation 5) propose an LWD management plan for the South Yuba River below Lake Spaulding (Spaulding No. 1 and No. 2 Development) to support natural ecosystem processes and the proposed reintroductions of anadromous salmonids to the upper Yuba River above Englebright dam. NMFS also recommends an interim measure for passage of LWD in South Yuba River at Lake Spaulding dam beginning at license issuance until a LWD Management Plan can be developed and implemented when reintroduction occurs.

NMFS 10(j) recommendation 4.3 and FWS recommendation 5 also include a coarse substrate management plan for the South Yuba River below Lake Spaulding dam to support natural ecosystem processes and the proposed reintroductions of anadromous salmonids to the upper Yuba River above Englebright dam.

Our Analysis

Considerable flow and habitat modeling performed by PG&E in coordination with other relicensing stakeholders demonstrates that the proposed flow measures should significantly improve the quantity and quality of aquatic habitat in project-affected stream reaches as compared to the existing license. LWD can be an important component of aquatic habitat structure in some watersheds; the quantity and type of LWD depends on characteristics of the watershed (e.g., vegetation, slope, soil depth) and stream channel (e.g., sinuosity, entrenchment, stability, gradient, riparian connectivity).

The LWD management plan specified by the Forest Service, to which PG&E has agreed, requires an initial survey of LWD during the first license year and periodic follow-up surveys at 5-year intervals. The proposed surveys would identify: (1) project reservoirs/lakes where LWD is trapped and accumulates in impoundments; (2) stream reaches where, as a result of project operations, the quantity and distribution of LWD is less than would be expected given the watershed and channel characteristics; (3) sites with access and hydraulic characteristics that could serve as appropriate locations for reintroduction of LWD below impoundments; (4) appropriate quantities of LWD to introduce; and (5) whether reintroduced LWD is being adequately redistributed through the stream reach. The scope of

the LWD management plan should be adequate to identify stream reaches with limited LWD as a result of project operations that would benefit from reintroduction of LWD below project dams.

Relicensing studies (technical memorandum 1-1, *Channel Morphology*) generally indicated that stream channels in project-affected stream reaches are stable, and substrate was typically composed of medium to coarse material. Specifically, these studies concluded that poor substrate quality and diversity observed in some stream reaches are typically relic conditions associated with historic hydraulic mining operations. Historic and current mining activities destabilize fledgling riparian growth and bed and banks. Historic mining created huge sediment reservoirs through which many channels continue to work. These deposits are noncohesive, do not retain water well, and are not conducive to strong riparian growth. The *Channel Morphology* study found the mobility of spawning gravels in the stream reaches below Lake Spaulding dam is no different than would exist under unregulated conditions. PG&E and the relicensing stakeholders did not identify any stream reaches where substrate conditions associated with project operations were of concern for resident aquatic species.

Available information suggests that some existing habitat conditions associated with LWD would likely support anadromous salmonids. Relicensing studies indicated that the amount of LWD observed in project-affected stream reaches (technical memorandum 1-1, *Channel Morphology, Attachment 1-11*) is less than observed in other Sierra Nevada streams (Ruediger and Ward, 1996) and is frequently not immersed (or wetted) within the stream channel. Ruediger and Ward (1996) and Berg et al. (1998) reported that LWD was stable with little movement and played a limited role in aquatic habitat; less than 6 percent was involved in pool formation or sediment retention. PG&E reported that the volume of LWD transported to and removed from project reservoirs is also relatively low and that LWD passes over most project dams and diversion dams during periods of high flow.

NMFS recommended an interim LWD measure that calls for specific volumes of LWD to be introduced to the South Yuba River. These recommended LWD volumes for South Yuba River are based on higher LWD volume, mobility, and recruitment estimates from East Fork Creek, a tributary to Middle Yuba River about 11 miles downstream of Milton diversion dam (Yuba-Bear Project). Riparian conditions and channel characteristics play an important role in the quantity and mobility of LWD within a watershed (Ruediger and Ward, 1996). Given the low volume of LWD generated in higher elevation, upstream project-affected reaches, East Fork Creek may not be representative of conditions that generate and transport LWD in much of the upper watersheds affected by project operations.

The reintroduction of anadromous salmonids to the upper Yuba River above Englebright dam is not imminent. The LWD surveys specified by the Forest Service would provide information for developing LWD management plans which would be implemented for specific stream reaches, as appropriate. This information would be used to evaluate the need for introduction of LWD in project-affected stream reaches and is appropriate for resident aquatic resources in the South Yuba River. Proposed monitoring of the condition of stream fish assemblages (resident rainbow trout in particular) in the South Yuba River would also provide insight into the response of habitat conditions as a result of implementation of proposed LWD measures and streamflow measures and associated changes in water temperatures in these stream reaches as they might apply to anadromous fish species.

Effects of Project Operations on Benthic Macroinvertebrates

Benthic macroinvertebrate communities can be highly influenced by a variety of naturally occurring and human-induced factors, including: (1) annual hydrologic cycle; (2) timing and magnitude of spring outflows; (3) streambed substrate composition; (4) channel gradient; (5) bank erosion and sediment deposition; (6) pollution; (7) riparian habitat degradation; (8) hydraulic mining; and (9) recreational activities. PG&E's *Channel Morphology* studies indicate that project operations have minimal effect on substrate conditions in project-affected stream reaches.

The Forest Service (condition 35) specifies and California Fish and Wildlife (recommendation 8) recommends monitoring the benthic macroinvertebrate community in large rivers and streams and small, upper elevation streams; diversity, biomass, and various unspecified community metrics would be analyzed. PG&E's alternative to the Forest Service condition proposes to implement the Aquatic Monitoring Plan (August 29, 2012), which does not include monitoring benthic macroinvertebrates. PG&E's rationale indicates that the benthic macroinvertebrate monitoring in the proposed Forest Service condition would be similar to the Surface Water Ambient Monitoring Program methods used during the relicensing studies, which demonstrated that benthic macroinvertebrate resources were adequate for maintenance of healthy fish populations. PG&E also suggests that such monitoring data would not be useful for evaluating the effects of the new license conditions, because benthic macroinvertebrate species composition and community diversity can exhibit considerable natural spatial variation depending on site-specific habitat metrics related more to substrate characteristics than to flow and water temperature. Although some shifts in the benthic macroinvertebrate community could occur as a result of changes in project operations, PG&E concludes that these changes would expand aquatic habitat and provide more persistent inundated channel in seasonal waters, benefiting benthic macroinvertebrate communities in project-affected stream reaches. These community shifts would likely have minimal effects on fish populations and fish condition.

Our Analysis

Benthic macroinvertebrates are an important component of stream ecosystems and a primary food source for fish communities in project-affected stream reaches of the Drum-Spaulding Project. For this reason, PG&E's studies included *Aquatic Macroinvertebrates* (technical memorandum 3-10). Sampling and analysis conformed to the targeted riffle composite protocol used to describe benthic macroinvertebrate assemblages and physical habitat in the California Water Board's Surface Water Ambient Monitoring Program (February 2007). Eighteen common macroinvertebrate metrics and two multi-metric indexes were used to evaluate each site. The multi-metric indexes included the index of biotic integrity (IBI) and the multi-metric index (MMI). Both of these multi-metric indexes are designed to evaluate the impacts of hydropower operations on stream condition as reflected by the benthic community; the MMI is specific to the west slope of the Sierra Nevada. Rehn (2009) developed a benthic macroinvertebrate-based IBI metric for use in evaluating effects of hydroelectric projects; all other factors being equal, this metric tends to be lowest immediately downstream of dams and diversions, but normally increases with distance below these structures. However, stream characteristics, such as substrate type and riparian vegetation composition, can exercise a greater effect on benthic macroinvertebrate community metrics, regardless of distance from dams or diversion structures (Bahuguna et al. 2004).

In general, IBI and MMI scores from the relicensing studies were slightly higher at middle elevation sites (i.e., 2,501 to 6,500 feet msl), and at sites classified as montane compared to foothill sites (i.e., 900 to 2,500 feet msl). Lower scores were more common in the low elevation western Placer County stream reaches. The IBI and MMI scores for multiple sites within watersheds did not show consistent trends with distance downstream from project reservoir or diversion dams. Other habitat factors (e.g., ecoregion, riparian vegetation, substrate conditions not affected by project operations, historic non-project uses) appeared to exercise a stronger influence on the benthic macroinvertebrate community. Metrics for a reference site in the upper North Yuba River were in the same range as higher elevation sites in Middle Yuba River and South Yuba River Basins.

The benthic macroinvertebrate community appears to be adequate to support the stream fish community in these stream reaches. Given that relicensing studies could not distinguish project-related influences on the benthic macroinvertebrate community, it does not appear likely that flow changes related to new minimum flow regimes would be discernible with continued project-wide benthic macroinvertebrate survey methods. Consequently, we do not find that continued project-wide benthic

macroinvertebrate monitoring would generate data adequate to evaluate the effects of flow change in project-affected stream reaches or inform future decisions related to project impacts, minimum streamflow needs, or fishery management in these stream reaches.

Effects of Project Operations on Special Status Species

Increased flows, reduced flow fluctuations, and cooler water temperatures that would result from flow measures (section 3.3.2.2.2, *Instream Flows*; 3.3.2.2.4, *Recession from Peak Flows and Flow Fluctuations*; and section 3.3.2.2.7, *Flow Augmentation for Management of Water Temperature*) proposed by PG&E and the relicensing stakeholders to enhance aquatic habitat, also have the potential to affect habitat for special status species in some project affected reaches.

Our Analysis

Only one special-status fish species occurs in the vicinity of the projects: hardhead (*Mylopharodon conocephalus*), which is listed by the Forest Service as a Sensitive Species and by California Fish and Wildlife as a California Species of Special Concern. Hardhead may occur in lower elevation sections of the South Yuba River and in lower Auburn Ravine; however, hardhead was not found in any reservoirs or stream reaches during PG&E's studies. Hardhead inhabit areas that have clear, deep pools with sandy, gravel/boulder substrates and slow water velocities. Hardhead generally prefer warmwater, occurring in streams that reach summer water temperatures greater than 20°C. Under laboratory conditions, their reported optimum water temperature range is 24°C to 28°C (Moyle, 2002).

While the benthic macroinvertebrate community is used by the Forest Service as a Management Indicator Species, no specific species have been identified as special status species.

Increased flows as a result of flow measures proposed by PG&E and the relicensing stakeholders for the South Yuba River have the management objective of enhancing aquatic habitat for resident rainbow trout. These measures would extend areas of South Yuba River that generally remain below 20°C year-round farther downstream than under the existing license. While this would expand optimal habitat for trout, it has the potential to displace optimal habitat for hardhead farther downstream to stream reaches closer to Englebright Lake. Temperature modeling (section 3.3.2.2.7, *Flow Augmentation for Management of Water Temperature*) indicates that the effect of higher flows on reducing water temperature is dissipated with distance downstream by the warming effect of air temperature. Given that no hardhead were observed in the reaches of the South Yuba River between Lake Spaulding dam and Poorman Creek and the interaction of air and water temperatures over distance, it is not likely that the higher proposed flows in the South Yuba River would have a significant adverse effect on hardhead habitat.

Increased minimum streamflows have been proposed for Auburn Ravine to provide cooler water temperatures to enhance aquatic habitat for resident rainbow trout in the stream reach immediately downstream of PG&E's release point from South canal. No hardhead were collected upstream of the Auburn Ravine 1 diversion dam, about 4 miles downstream of the release point from south canal. In the lower reaches of Auburn Ravine below the Auburn Ravine 1 diversion dam which might be inhabited by hardhead, numerous diversions, withdrawals, and discharges cumulatively affect flow and water temperature to such a point that it is not possible to assess individual effects from PG&E's operations of the Wise powerhouses and the South canal (section 3.3.2.3, *Cumulative Effects*).

Implementation and Annual Review of Aquatic Monitoring Plan

The agencies involved in the relicensing process have management responsibilities for aquatic resources in project-affected stream reaches and have proposed a variety of conditions and

recommendations through their authority under sections of the FPA. These agencies and PG&E have recommended and proposed measures designed to enhance aquatic habitat for target resident species and have proposed plans of different scales for monitoring the effects of flow-related changes on aquatic resources under the new license. Periodic review of the results of the monitoring plan would assess the effectiveness of proposed protection and enhancement measures and provide recommendations to enhance value of the monitoring program.

The Forest Service (condition 35) specifies and California Fish and Wildlife (recommendation 8) recommends that PG&E prepare comprehensive monitoring plans covering aquatic, terrestrial, recreational, aesthetic, cultural, and historic resources. PG&E made an alternative proposal to the Forest Service condition to implement an aquatic monitoring plan specific to selected aquatic resources (see previous discussions) in specific project-affected stream reaches that could potentially be affected by changes in minimum streamflows and water temperature as a result of proposed conditions in the new license. PG&E's rationale for their alternative aquatic monitoring plan proposes that appropriate monitoring of other resources would be covered by focused resource-specific monitoring plans.

The agencies proposed establishment of an Ecological Group to "assist the Licensee in the project-wide implementation of Monitoring Plans and review and evaluation of monitoring data." The proposed group would consist of the Forest Service, BLM, California Fish and Wildlife, California Water Board, and other interested stakeholders. PG&E filed an alternative to the Forest Service condition which points out that responsibility for implementation of any monitoring plans following final approval by the agencies is the sole responsibility of PG&E and that review and evaluation of monitoring results is intended to be one component of the annual consultation process.

PG&E proposes an Ecological Group as an alternative to the Forest Service condition that would have a more focused scope. The role of the group would be to review and evaluate specific monitoring data associated with the proposed South Yuba River *Supplemental Flow* condition and provide recommendations for the ongoing implementation and evaluation of that program.

Our Analysis

Implementation of appropriate monitoring plans and review of the results of these surveys are essential to determining if flow-related modifications in project operations included in the new license provide the benefits anticipated by the relicensing stakeholders. Segregation of the monitoring efforts for each resource area into separate monitoring plans allows a more focused process for review of the plans and subsequent implementation, data collection, and analysis. Effective review can be accomplished within the annual consultation process by work groups composed of the most appropriate stakeholders and resource experts and managers for individual affected resources. As required, focused monitoring plans can be updated or modified more efficiently without affecting other resource areas or involving a larger group of stakeholders than necessary.

The Ecological Group as proposed by the agencies would have more far-reaching responsibilities than necessary; input on implementation can be conducted within the scope of the annual consultation process. It would be reasonable to expect that work groups could be organized around resource areas within the consultation process, but this organizational process can be developed by the participants and does not need to be defined within the license.

Given a certain amount of uncertainty involved in the South Yuba River *Supplemental Flow* Program (section 3.3.2.2.7, *Flow Augmentation for Management of Water Temperature*), the proposal by PG&E for a more focused Ecological Group would provide a reasonable mechanism, particularly during the initial years, for more frequent evaluation than provided by annual consultation on the effectiveness of the *Supplemental Flow* releases from the cold water pool in Lake Spaulding for managing water

temperature downstream of Lake Spaulding dam for resident rainbow trout and special status species such as foothill yellow-legged frog. The Ecological Group would be involved in the routine evaluation of real-time water temperature data to assess: (1) the effectiveness of supplemental coldwater release on maintaining coldwater habitat in the South Yuba River below Lake Spaulding dam; (2) the rate of drawdown of the cold water pool in Lake Spaulding; and (3) the need to increase or decrease supplemental releases.

Effect of Recreation Flows on Aquatic Biota

PG&E and involved agencies have proposed several flow modifications integrated into the spill cessation schedule (section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuation*) that would provide additional and predictable opportunities for recreational whitewater boating. Following negotiation among relicensing stakeholders, PG&E proposes (DS-AQR1, Part 7) a gradual cessation of spills to the South Yuba River at Lake Spaulding dam (Spaulding No. 1 and No. 2 Development); the two-tier schedule provides up to 6 days at higher flows when spills begin to decline that would accommodate recreational whitewater boating. PG&E also proposes (DS-AQR1, Part 5) to provide high target flows in Fordyce Creek when spills at Fordyce Lake dam and Lake Spaulding dam end, which would also provide recreational boating opportunities in Fordyce Creek between Fordyce Lake and Lake Spaulding. These measures are consistent with Forest Service condition 29 and California Fish and Wildlife recommendations 2.6 and 2.8.

Our Analysis

The sustained high flows under the spill cessation and Fordyce Lake drawdown proposals would provide recreational boating opportunities during periods that would naturally experience high flows under unregulated flow conditions. The range of flows proposed is within that typical of estimated unregulated flow conditions in Fordyce Creek below Fordyce Lake dam and South Yuba River below Lake Spaulding dam. Aquatic monitoring programs discussed previously would provide data to evaluate the effectiveness of these spill cessation measures and recreational flows to protect and enhance aquatic resources in the affected stream reaches.

The Spill Cessation measure for the South Yuba River (section 3.3.2.2.4) and Fordyce Lake drawdown (section 3.3.2.2.2) as discussed previously would ensure that changes from high flow events more naturally mimic the rate of flow decrease typical of those waters in an unregulated condition. An additional benefit of this measure would be to provide predictable high flow opportunities for recreational whitewater boating. Because these high recreational flows are in a range and duration typical of unregulated waters, we would not expect any adverse effects on aquatic habitat and biota. The proposed aquatic monitoring plan would provide data for evaluating the effects of high flows and flow cessation on aquatic resources.

Control of Non-native Aquatic Invasive Species

The spread of non-native invasive species and their impact on aquatic communities and native species has become more common and of concern to resources managers. Prevention of further introductions and control of existing populations of non-native invasive species is of particular concern in areas with heavy recreational use and inter-basin transfers of water.

Forest Service condition 33 specifies and California Fish and Wildlife recommendation 6 recommends an aquatic invasive species management plan. The Forest Service and California Fish and Wildlife identified four aquatic invasive species of specific concern: (1) New Zealand mudsnail (*Potamopyrgus antipodarum*); (2) Quagga mussel (*Dreissena bugensis*); (3) zebra mussel (*Dreissena polymorpha*); and (4) invasive algae, rock snot (*Didymosphenia geminata*). The agencies require that a

plan be submitted within 1 year for management of these invasive species and prevention of their spread within the project boundaries. The plan would identify aquatic invasive species BMPs, including user education and measures to prevent transfer of aquatic invasive species between waterbodies.

PG&E's alternative to Forest Service condition 33 proposes to implement the Integrated Vegetation Management Plan filed August 30, 2012, which includes in section 2.4 (*Aquatic Invasive, Species Prevention Guidelines*) all aspects (table 3-197) of the Forest Service and California Fish and Wildlife condition/recommendation for management of aquatic invasive species. In the filed Aquatic Monitoring Plan (discussed previously in this section, *Implementation and Annual Review of Aquatic Monitoring Plan*), PG&E also proposes to provide annual training to staff performing monitoring program tasks to record incidental observations of aquatic invasive species in study reaches and to implement BMPs to prevent transfer and spread of aquatic invasive species between waterbodies as a consequence of the aquatic monitoring plan surveys.

Our Analysis

Some aquatic invasive species have been identified in project-affected water. An effective management plan for these species could help prevent, delay, or limit expansion of their ranges and associated regional and waterbody-specific impacts. California Fish and Wildlife considers most project waters to be at very low risk for Quagga and zebra mussel given the very low calcium concentrations observed in this region.

Because many of the best management practices for public education and control of invasive species are similar regardless of whether the invasive species are plant or animals, PG&E included control and management of aquatic invasive species in their Integrated Vegetation Management Plan (detailed discussion in section 3.3.3.2.1, *Vegetation Management*). Management at recreation facilities and education of users is a key aspect of controlling the introduction and spread of invasive species in project waters. The Integrated Vegetation Management Plan proposed by PG&E incorporates the key components identified by the agencies in their conditions or recommendations for management of aquatic invasive species.

Once finalized and approved, implementation of the plan should be effective tool for reducing the risk of dispersal of aquatic invasive species across project boundaries in conjunction with project operations and monitoring, and should reduce the risk of dispersal by recreational users. Eradication of aquatic invasive species once established is extremely difficult; consequently, effective programs to educate users to prevent the introduction of aquatic invasive species into waters in which they do not occur are an important component of the plan.

Recording of incidental observations of aquatic invasive species as part of the proposed Aquatic Monitoring Plan (discussed previously) will provide another mechanism for identifying new incidences of invasive species in project waters which would then require implementation of appropriate best management practices described in the Integrated Vegetation Management Plan.

Yuba-Bear Project

Fish Entrainment

Entrainment into project canals, powerhouses and low-level reservoir outlets of various life stages of fish has been identified as an adverse impact on fish populations in project-affected waters. While the intakes to Yuba-Bear Project canals are not screened under existing project operations, a number of screening technologies have been developed and refined to prevent or minimize the entrainment of fish, particularly early life stages, into water diversion canals. NMFS and California Fish and Wildlife have

developed guidelines for screening devices to reduce entrainment at diversions on rivers and in reservoirs and lakes. Relicensing studies evaluated the magnitude of fish entrainment at several project canal diversions with limited success. Resource agencies have expressed concern specifically related to entrainment of young resident trout at the Milton diversion dam on Middle Yuba River.

In the final license application, NID proposed (YB-ARQ6) to monitor fish entrainment into the Milton Bowman conduit on a weekly basis between April 15 and August 15 beginning the first full year after license issuance. Following the first year of monitoring NID proposed to file a report summarizing the results and proposing measures, as necessary to reduce fish entrainment. Forest Service condition 29 specifies and California Fish and Wildlife recommendation 2.12 recommends design and construction of a cylindrical narrow-slot fish screen at the entrance to the Milton-Bowman conduit. In response, NID proposes a Fish Entrainment Protection Plan to include a fish screen installed at the entrance to Milton-Bowman conduit, designed using guidelines and specifications from *Fish Screening Criteria for Anadromous Salmonids* (NMFS, 1997) and *Fish Screening Criteria* (California Fish and Wildlife, 2002). The Fish Entrainment Protection Plan would identify required local, state, and federal permits; specify design information; develop a construction implementation schedule; develop design, construction, and operation and maintenance costs; and outline an agency (Forest Service, California Fish and Wildlife, and California Water Board) consultation process/schedule for planning, permitting, and construction of the screens.

NID proposed to complete the plan and applications for all permits within 1 year of license issuance and to complete construction within 2 years of receiving the necessary permits and approvals.

Our Analysis

Relicensing entrainment studies indicated relatively low numbers of entrained organisms at several project powerhouses and low level outlets; however, data generated at the Milton-Bowman conduit intake were inconclusive as a result of sampling artifacts. While NID proposed to continue to monitor this location, the agencies proposed that NID implement measures for design and construction of an intake screening device to reduce entrainment, particularly of young trout lifestages. Construction and operation of the proposed canal intake screens consistent with the design criteria recommended by the agencies would minimize entrainment losses into the Milton-Bowman conduit of most key aquatic species during their early life stages. Although entrainment of juveniles and adults appears to be limited based on relicensing studies, it would be eliminated by screens operated during late spring and summer when juvenile fish would be most susceptible to entrainment. The plan provides operational flexibility for occasional removal of the screens during periods when high debris loading threatens project operations and efficiency and screen integrity.

Protection of Fish in Project Canals

The existing project canal intakes are not screened to exclude entry by resident fish and fish that enter the canals can die when the canals are drained during an outage. When a canal is dewatered during scheduled or unscheduled maintenance and emergency outages, fish can become stranded in the canal as water levels drop. To minimize potential mortality to fish during outages, NID proposes (YB-AQR5) to implement a Canal Fish Rescue Plan. The plan affects facilities in the Spaulding No. 3 Development, Dutch Flat No. 2 Development, and Chicago Park Development; the Milton Bowman conduit is completely enclosed, inaccessible for fish rescue operations, and would be screened under the condition described above. The plan was designed to protect fish trapped in the project canals when the canals are taken out of service for scheduled or unscheduled maintenance or emergencies. The Forest Service (condition 30) and BLM (condition 11) specify and California Fish and Wildlife (recommendation 3) recommends that NID develop a plan in coordination with the agencies within the first year of the license.

NID's draft plan describes the canal facilities (table 3-198) and locations where fish management and response actions would be implemented at the time of an outage; maps identify the type of facility (e.g., flume, canal, tunnel) and access points. The plan also describes the periods when outages are most likely to occur and the procedures that would be implemented for drawdown of these water conveyance structures and for fish management and protection. The plan also includes protocols for agency notification and consultation during outage events and for annual planning.

Our Analysis

The plan submitted by NID provides a comprehensive approach for communication and planning and for implementation of protocols to collect and relocate, as necessary, fish that are stranded in canals when the canal is taken out of service for maintenance or in the event of an emergency. The plan as filed describes effective measures that would be protective of aquatic resources within the project canals. Following review and approval by the agencies, the plan would be included in the license and implemented within 90 days of license issuance.

Reservoir Management Effects on Aquatic Biota

The proposed increased minimum streamflows, spill cessation schedules, and supplemental flows for water temperature management and recreational boating (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*; section 3.3.5.2, *Recreation Resources*) could result in earlier and larger drawdown of some project lakes/reservoirs, potentially affecting shallow water lake habitat, important juvenile-rearing habitat for many species as well as access and use of recreation facilities. Many of the larger lakes/reservoirs are managed for and receive heavy recreational fishing pressure; annual stocking is a key component of California Fish and Wildlife's recreational fishery management program. Although natural reproduction occurs in some of these project waters, stocking is necessary to sustain populations of game fish in waters with high angler usage.

NID proposes (YB-AQR2 and YB-AQR3) to stock Bowman Lake and Rollins reservoir. Forest Service recommendation 9 also proposed a fish stocking program to support recreational fishing in these two project waters, but at different stocking rates. We analyze these conflicting stocking proposals in more detail in section 3.3.5.2, *Recreational Resources*.

Monitoring of Fish Populations in Project-Affected Stream Reaches

NID proposes several measures to improve flows and maintain water temperatures in project-affected stream reaches below project dams and diversions to improve aquatic habitat and enhance aquatic resources (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*).

NID did not propose continued monitoring in these project stream reaches in its final license application. The Forest Service (condition 35) and BLM (condition 23) specify and California Fish and Wildlife (recommendation 8) recommends monitoring the stream fish community in large rivers and streams and small, upper elevation streams; species composition, abundance, biomass, size and age structure, and relative stock density would be analyzed.

NID proposed an alternative to Forest Service condition 35, which proposes to implement the Aquatic Monitoring Plan, focused on larger stream reaches where increased flow and cooler water temperature are most likely to affect aquatic resources under the new license conditions. The Forest Service did not comment on the NID alternative to their condition 35. Stream reaches proposed in the NID alternative include: (1) stream reaches below Jackson Meadows dam and Milton diversion dam on

the Middle Yuba River (Bowman Development); (2) Bowman-Spaulding diversion dam stream reach below Canyon Creek (Spaulding No. 3 Development); (3) Bear River below Dutch Flat afterbay dam (Chicago Park Development); and (4) Bear River below Bear River canal diversion dam (Rollins Development). NID does not propose to monitor fish population in any small, higher elevation headwater streams, which have limited additional water resources and would, under unregulated conditions, be seasonal streams partially or completely dry during mid-summer and fall.

NID would perform the monitoring with the same methods (electrofishing and snorkeling) used during relicensing studies and would focus on resident rainbow trout. Monitoring would be conducted during the first 2 years following license issuance and subsequently in years 5, 6, 9 and 10; after year 10, NID and the agencies would collaboratively evaluate the results and make a determination on the need for and magnitude of continued stream fish monitoring.

Our Analysis

Changes in monthly minimum streamflows, spill cessation schedules, and supplemental South Yuba River releases, which we discuss in depth previously, are key measures designed to protect, maintain, and enhance aquatic habitat for resident species in project-affected stream reaches. The flow increases vary based on water year type and have an associated cost in reduced power generation and risk to water delivery, particularly during exceptionally dry conditions. An aquatic monitoring program would provide a mechanism for evaluating the benefit of these project operational changes and assessing if they are accomplishing their intended objectives.

Annual review of program results during the annual consultation process would involve the resource agencies in assessing the success of the proposed flow conditions and provide a platform for adjusting the monitoring program, if needed.

Relicensing studies and statistical estimation of unregulated hydrology indicate that many of the small, higher elevation headwater stream reaches are seasonal, which are dry or almost dry during late summer in many years, and are supporting limited opportunistic aquatic resources. Waters in the upper watershed with more permanent flow conditions support coldwater fish communities dominated by or exclusively resident rainbow and/or brown trout. Fish generally exhibit good condition factors and a mix of year classes. NID's *Stream Fish Population* (technical memorandum 3-1) indicates that "stream fish were in good condition. Fish exhibited robust bodies; were free of visible disease, parasites, and lesions; possessed reasonable growth rates for the region; and exhibited normal behavioral patterns. Multiple age classes of fish were collected at most Level II sites, indicating regular recruitment of juvenile fish to these populations." In some waters, age 0 trout are uncommon, which may indicate that the population in the stream reach is supported primarily by stocking or migration of older fish into the stream reach. An assemblage of trout and cool water cyprinid species was found at lower elevations with accretion of slightly warmer flow.

The stream fish monitoring plan proposed by NID targets several stream reaches most likely to benefit from the proposed increased minimum streamflows, anticipated decreases in water temperature, and improvements in aquatic habitat. The proposed stream reaches were previously surveyed during the relicensing studies; use of the same methods would provide a before and after comparison of stream populations. The proposed plan would provide intermittent surveys during 6 of the first 10 years following license issuance, which should be adequate to depict community changes and trends in these stream reaches. At the end of this period, an evaluation of the population trends and habitat conditions over the 10-year period would provide a basis for assessing the adequacy and benefits of the environmental measures and making a determination if monitoring should be continued or modified moving forward.

For many of the small, higher elevation streams, the proposed minimum flow measures will ensure flows year round in these stream reaches, which are often dry late in the summer under existing conditions, particularly during drier years. It might be anticipated that the introduction of permanent, although low, flows to these stream reaches would have a limited effect on resident coldwater fish assemblages; however, the permanent inundation of portions of the channel could result in improved conditions for benthic macroinvertebrates (see section on benthic macroinvertebrates below). It is not clear that long-term monitoring of these stream reaches would generate data that would be useful for making future project water management decisions.

Effect of Operations on Aquatic Habitat in Project-Affected Stream Reaches

The quantity and quality of aquatic habitat are affected by project operations, including the influence of flow, wetted perimeter, magnitude and frequency of inundation, availability and dispersal of LWD, and distribution and characteristics of sediment/substrate. The objectives of various measures proposed by NID and recommended by the relicensing stakeholders are to improve aquatic habitat conditions for resident aquatic biota compared to existing conditions. We discuss the anticipated enhancements of aquatic habitat as a result of proposed minimum streamflows and flow management previously (section 3.3.2.2.2, *Instream Flow*; section 3.3.2.2.4, *Recession From Peak Flows and Flow Fluctuations*; section 3.3.2.2.7, *Flow Augmentation for Water Temperature Management*).

Reservoir operations and regulated flows have the potential to alter two key components of habitat for aquatic resources: (1) the availability of LWD in downstream reaches; and (2) the characteristics and distribution of substrate material in streams. LWD can provide cover, affect habitat diversity, and contribute to diversity of channel morphology and substrate; under the existing license, this material is removed from reservoirs as needed and stockpiled or burned. NID proposes (YB-AQR7) a management plan for LWD at Rollins dam. NID proposes to periodically move LWD blocked by the log boom upstream of Rollins dam (Rollins Development) to the downstream side of the boom and allow this material to pass over the dam during spill events.

BLM (condition 9) specifies and California Fish and Wildlife (recommendation 2.10) recommends an additional survey of the quantity and distribution of LWD over the 10-mile reach of the Bear River downstream from Rollins dam during the first year following issuance of the license and at 5-year intervals thereafter; as needed, LWD would be anchored in the channel. BLM condition 24 specifies a similar LWD program at the Dutch Flat afterbay dam (Chicago Park Development). NID's alternatives to BLM conditions (August 30, 2012) appear to indicate that it accepts the additional survey requirements at Rollins dam and the Dutch Flat afterbay.

Forest Service condition 36 specifies a more project-wide LWD management program, including survey of locations and quantity of LWD collected and identification of appropriate locations downstream of project dams for reintroduction of LWD for mobilization during the 2- and 5-year flow events. NID proposes an alternative (August 30, 2012) to the Forest Service condition that includes implementation of an LWD management plan for Jackson Meadows and Bowman dams (the two largest project storage reservoirs on Forest Service lands) within 1 year of license issuance. NID excludes diversion dams (Milton and Bowman-Spaulding) because LWD is not trapped by these facilities under existing project operations, but passes over the structures. Other small, high elevation lakes are excluded from NID's plan because the associated watersheds and downstream reaches are granitic bedrock canyons that generate minimal LWD for downstream reaches.

NMFS 10(j) (recommendation 3.3 and 4.3) and FWS (recommendation 5) propose development of an LWD management plan for future implementation in Middle Yuba River below the Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam to support natural ecosystem processes and the proposed future reintroductions of anadromous salmonids to the upper Yuba River

above Englebright dam. NMFS also recommends an interim measure for passage of LWD in Middle Yuba River at Milton diversion dam and in Canyon Creek at Bowman-Spaulding diversion dam beginning at license issuance until a LWD Management Plan can be developed and implemented when reintroduction occurs.

NMFS 10(j) (recommendation 3.3 and 4.3) and FWS (recommendation 5) propose development of a coarse substrate management plan for the Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam to support natural ecosystem processes and the proposed future reintroductions of anadromous salmonids to the upper Yuba River above Englebright dam.

Our Analysis

Considerable flow and habitat modeling performed by NID in coordination with other relicensing stakeholders demonstrates that the proposed flow measures should significantly improve the quantity and quality of aquatic habitat in project-affected stream reaches as compared to the existing license. LWD can be an important component of aquatic habitat structure in some watersheds; the quantity and type of LWD depends on characteristics of the watershed (e.g., vegetation, slope, soil depth) and stream channel (e.g., sinuosity, entrenchment, stability, gradient, riparian connectivity).

The LWD management plan specified by BLM and agreed to by NID would ensure that LWD in the Bear River is not trapped upstream of Dutch Flat afterbay dam and Rollins dam. BLM proposed periodic surveys of LWD in the lower Bear River below Rollins dam that would provide information on the movement of LWD in and through this stream reach following passive release over Rollins dam and the Bear River canal diversion dam. The results of these periodic surveys could guide adjustments to the LWD management plan, if necessary, to create a more natural distribution of LWD to enhance aquatic habitat in the lower Bear River.

The Forest Service's LWD management plan requires an initial project-wide survey of LWD during the first license year and periodic follow-up surveys at 5-year intervals. The Forest Service's specified survey would identify: (1) project reservoirs/lakes where LWD is trapped and accumulates in impoundments; (2) stream reaches where, as a result of project operations, the quantity and distribution of LWD is less than would be expected given the watershed and channel characteristics; (3) sites with access and hydraulic characteristics that could serve as appropriate locations for reintroduction of LWD below impoundments; (4) appropriate quantities of LWD to introduce; and (5) whether reintroduced LWD is being adequately redistributed through the stream reach.

NID indicates that many project-affected stream reaches flow through high elevation watersheds with stable bedrock and boulder channels that generate minimal LWD and that LWD readily passes over project diversion dams during periods of high flow and spills. Consequently, NID states that a project-wide survey would generate little useful information for managing LWD. Instead NID's alternative to Forest Service condition 36 would develop and implement LWD management plans at the two large impoundments on Forest Service land that impede the movement of LWD downstream, Jackson Meadows reservoir and Bowman Lake. NID has proposed to develop an LWD management plan for these two project impoundments which would address the five components proposed in the Forest service conditions for these specific project impoundments and affected stream reaches. A one-time survey of lakes, reservoirs, and affected stream reaches on Forest Service lands could identify any additional locations that should be included in LWD management plans. A one-time survey, rather than intermittent surveys proposed by the Forest Service at 5-year intervals, should be adequate to identify the most appropriate candidate locations for implementation of an LWD management plan.

Relicensing studies (technical memorandum 1-1, *Channel Morphology*) generally indicated that stream channels in project-affected stream reaches are stable, and substrate was typically composed of medium to coarse material. Specifically, these studies concluded that poor substrate quality and diversity observed in some stream reaches are typically relic conditions associated with historic hydraulic mining operations. Historic and current mining activities destabilize fledgling riparian growth and bed and banks. Historic mining created huge sediment reservoirs through which many channels continue to work. These deposits are non-cohesive, do not retain water well, and are not conducive to strong riparian growth. The *Channel Morphology* study found that mobility of spawning gravels in stream reaches below Milton diversion dam and Bowman-Spaulding diversion dam is no different under existing project operations than would exist under unregulated conditions. NID and the relicensing stakeholders did not identify any stream reaches where substrate conditions associated with project operations were of concern for resident aquatic species.

Available information suggests that some existing habitat conditions associated with LWD would likely support anadromous salmonids. Relicensing studies indicated that the amount of LWD observed in project-affected stream reaches (technical memorandum 1-1, *Channel Morphology, Attachment 1-11*) is less than observed in other Sierra Nevada streams (Ruediger and Ward, 1996) and is frequently not immersed (or wetted) within the stream channel. Ruediger and Ward (1996) and Berg et al. (1998) reported that LWD was stable with little movement and played a limited role in aquatic habitat; less than 6 percent was involved in pool formation or sediment retention. NID also reported that the volume of LWD transported to and removed from project reservoirs is also relatively low and that LWD passes over most project dams and diversion dams during periods of high flow.

NMFS recommends an interim LWD measure that calls for specific volumes of LWD to be introduced in Middle Yuba River at Milton diversion dam and in Canyon Creek at Bowman-Spaulding diversion dam. These recommended LWD volumes for Middle Yuba River and Canyon Creek are based on higher LWD volume, mobility, and recruitment estimates from East Fork Creek, a tributary to Middle Yuba River about 11 miles downstream of Milton diversion dam. Riparian conditions and channel characteristics play an important role in the quantity and mobility of LWD within a watershed (Ruediger and Ward, 1996). Given the low volume of LWD generated in higher elevation, upstream project-affected reaches, East Fork Creek may not be representative of conditions that generate and transport LWD in much of the upper watersheds affected by project operations.

The reintroduction of anadromous salmonids to the upper Yuba River above Englebright dam is not imminent. The LWD surveys specified by Forest Service would provide information for developing LWD management plans which would be implemented for specific stream reaches, as appropriate. This information would be used to evaluate the need for introduction of LWD in project-affected stream reaches and is appropriate for resident aquatic resources in the Middle Yuba River and Canyon Creek. Proposed monitoring of the condition of stream fish assemblages (resident rainbow trout in particular) in Middle Yuba River and Canyon Creek would also provide insight into the response of habitat conditions as a result of implementation of proposed LWD measures and streamflow measures and associated changes in water temperatures in these stream reaches as they might apply to anadromous fish species.

Effects of Project Operations on Benthic Macroinvertebrates

Benthic macroinvertebrate communities can be highly influenced by a variety of naturally occurring and human-induced factors, including: (1) annual hydrologic cycle; (2) timing and magnitude of spring outflows; (3) streambed substrate composition; (4) channel gradient; (5) bank erosion and sediment deposition; (6) pollution; (7) riparian habitat degradation; (8) hydraulic mining; and (9) recreational activities. NID's *Channel Morphology* studies indicate that project operations have minimal effect on substrate conditions in project-affected stream reaches.

The Forest Service (condition 35) and BLM (condition 23) specify and California Fish and Wildlife (recommendation 8) recommends monitoring the benthic macroinvertebrate community in large rivers and streams and small, upper elevation streams; diversity, biomass, and various unspecified community metrics would be analyzed. NID's alternative to the Forest Service condition proposes to implement the Aquatic Monitoring Plan (August 29, 2012), which does not include monitoring benthic macroinvertebrates. NID's rationale indicates that the benthic macroinvertebrate monitoring in the proposed Forest Service condition would be similar to the Surface Water Ambient Monitoring Program methods used during the relicensing studies, which demonstrated that benthic macroinvertebrate resources were adequate for maintenance of healthy fish populations. NID also suggests that such monitoring data would not be useful for evaluating the effects of the new license conditions because benthic macroinvertebrate species composition and community diversity can exhibit considerable natural spatial variation depending on site-specific habitat metrics related more to substrate characteristics than to flow and water temperature. Although some shifts in the benthic macroinvertebrate community could occur as a result of changes in project operations, NID concludes that these changes would expand aquatic habitat and provide more persistent inundated channel in seasonal waters, benefiting benthic macroinvertebrate communities in project-affected stream reaches. These community shifts would likely have minimal effects on fish populations and fish condition.

Our Analysis

Benthic macroinvertebrates are an important component of stream ecosystems and a primary food source for fish communities in project-affected stream reaches of the Yuba-Bear Project. For this reason, PG&E's studies included *Aquatic Macroinvertebrates* (technical memorandum 3-10). Sampling and analysis conformed to the targeted riffle composite protocol used to describe benthic macroinvertebrate assemblages and physical habitat in the California Water Board's Surface Water Ambient Monitoring Program (February 2007). Eighteen common macroinvertebrate metrics and two multi-metric indexes were used to evaluate each site. The multi-metric indexes included the IBI and the MMI. Both of these multi-metric indexes are designed to evaluate the impacts of hydropower operations on stream condition as reflected by the benthic community; the MMI is specific to the west slope of the Sierra Nevada. Rehn (2009) developed a benthic macroinvertebrate-based IBI metric for use in evaluating effects of hydroelectric projects; all other factors being equal, this metric tends to be lowest immediately downstream of dams and diversions, but normally increases with distance below these structures. However, stream characteristics, such as substrate type and riparian vegetation composition, can exercise a greater effect on benthic macroinvertebrate community metrics, regardless of distance from dams or diversion structures (Bahuguna et al., 2004).

In general, IBI and MMI scores were slightly higher at middle elevation sites (i.e., 2,501 to 6,500 feet msl) and at sites classified as montane compared to foothill (i.e., 900 to 2,500 feet msl). Lower scores were more common in the low elevation western Placer County stream reaches. The IBI and MMI scores for multiple sites within watersheds did not show consistent trends with distance downstream from project reservoir or diversion dams. Other habitat factors (e.g., ecoregion, riparian vegetation, substrate conditions not affected by project operations, historic non-project uses) appeared to exercise a stronger influence on benthic macroinvertebrate community. Metrics for a reference site in the upper North Yuba River were in the same range as higher elevation sites in Middle Yuba River and South Yuba River Basins.

The benthic macroinvertebrate community appears to be adequate to support the stream fish community in these stream reaches. Given that relicensing studies could not distinguish project-related influences on the benthic macroinvertebrate community it does not appear likely that flow changes related to new minimum flow regimes would be discernible from continued project-wide benthic macroinvertebrate survey methods. Consequently, we do not find that continued project-wide benthic

macroinvertebrate monitoring would generate data adequate to evaluate the effects of flow change in project-affected stream reaches or inform future decisions related to project impacts, minimum streamflow needs, or fishery management in these stream reaches.

Effects of Project Operations on Special Status Species

Increased flows, reduced flow fluctuations, and cooler water temperatures that would result from flow measures (section 3.3.2.2.2, *Instream Flows*; 3.3.2.2.4, *Recession from Peak Flows and Flow Fluctuations*; and section 3.3.2.2.7, *Flow Augmentation for Management of Water Temperature*) proposed by NID and the relicensing stakeholders to enhance aquatic habitat, also have the potential to affect habitat for special status species in some project affected reaches.

Our Analysis

Only one special-status fish species occurs in the vicinity of the projects: hardhead (*Mylopharodon conocephalus*), which is listed by the Forest Service as a Sensitive Species and by California Fish and Wildlife as a California Species of Special Concern. Hardhead may occur in lower elevation sections of the Middle Yuba River; however, hardhead was not found in any reservoirs or stream reaches during NID's studies. Hardhead inhabit areas that have clear, deep pools with sandy, gravel/boulder substrates and slow water velocities. Hardhead generally prefer warmwater, occurring in streams that reach summer water temperatures greater than 20°C. Under laboratory conditions, their reported optimum water temperature range is 24°C to 28°C (Moyle, 2002).

While the benthic macroinvertebrate community is used by the Forest Service as a Management Indicator Species, no specific species have been identified as special status species.

Increased flows as a result of flow measures proposed by NID and the relicensing stakeholders for the Middle Yuba River have the management objective of enhancing aquatic habitat for resident rainbow trout. These measures would extend areas of Middle Yuba River that generally remain below 20°C year-round farther downstream to an area upstream of the Wolf Creek confluence than under the existing license. While this would expand optimal habitat for trout, it has the potential to displace optimal habitat for hardhead farther downstream to stream reaches closer to Our House Reservoir. The *Block Flow* recommendation of California Fish and Wildlife would further augment flows and extend cooler water temperatures farther downstream. Temperature modeling (section 3.3.2.2.7, *Flow Augmentation for Management of Water Temperature*) indicates that the effect of higher flows on reducing water temperature is dissipated with distance downstream by the warming effect of air temperature. Given that no hardhead were observed in the reaches of the Middle Yuba River between Milton diversion dam and Wolf Creek and the interaction of air and water temperatures over distance, it is not likely that the higher proposed flows in the Middle Yuba River would have a significant adverse effect on hardhead habitat.

Implementation and Annual Review of Aquatic Monitoring Plan

The agencies involved in the relicensing process have management responsibilities for aquatic resources in project-affected stream reaches and have proposed a variety of conditions and recommendations through their authority under sections of the FPA. These agencies recommended and NID proposed measures designed to enhance aquatic habitat for target resident species and have proposed plans of different scales for monitoring the effects of flow-related changes on aquatic resources under the new license. Periodic review of the results of the monitoring plan would assess the effectiveness of proposed protection and enhancement measures and provide recommendations to enhance value of the monitoring program.

The Forest Service (condition 35) and BLM (condition 23) specify and California Fish and Wildlife (recommendation 8) recommends comprehensive monitoring plans covering aquatic, terrestrial, recreational, aesthetic, cultural, and historic resources. NID made an alternative proposal to the Forest Service condition to implement an Aquatic Monitoring Plan in specific project-affected stream reaches that could potentially be affected by changes in minimum streamflows and water temperature as a result of conditions in the new license. NID's rationale for their alternative aquatic monitoring plan proposes that appropriate monitoring of other resources would be covered by focused resource-specific monitoring plans.

The agencies proposed establishment of an Ecological Group to "assist the Licensee in the project-wide implementation of Monitoring Plans and review and evaluation of monitoring data." The proposed group would consist of the Forest Service, BLM, California Fish and Wildlife, California Water Board, and other interested stakeholders. NID filed an alternative to the Forest Service condition which points out that responsibility for implementation of any monitoring plans following final approval by the agencies is the sole responsibility of NID and that review and evaluation of monitoring results is intended to be one component of the annual consultation process.

Our Analysis

Implementation of appropriate monitoring plans and review of the results of these surveys are essential to determining if flow-related modifications in project operations included in the new license provide the benefits anticipated by the stakeholders. Segregation of the monitoring efforts for each resource area into separate monitoring plans allows a more focused process for review of the plans and subsequent implementation, data collection, and analysis. Effective review can be accomplished within the annual consultation process by work groups composed of the most appropriate stakeholders and resource experts and managers for individual affected resources. As required, focused monitoring plans can be updated or modified more efficiently without affecting other resource areas or involving a larger group of stakeholders than necessary.

The Ecological Group as proposed by the agencies would have more far-reaching responsibilities than necessary; input on implementation can be conducted within the scope of the annual consultation process. It would be reasonable to expect that work groups could be organized around resource areas within the consultation process, but this organizational process can be developed by the participants and does not need to be defined within the license.

Effect of Recreation Flows on Aquatic Biota

NID and relicensing stakeholders have proposed several flow modifications integrated into the spill cessation schedule (section 3.3.2.2.4) that would provide additional and predictable opportunities for recreational whitewater boating. These opportunities would generally occur during periods that would naturally experience high flows under unregulated flow conditions, and the range of flows is within that typical of unregulated conditions. Aquatic monitoring programs discussed previously would provide data to evaluate the effectiveness of these spill cessation measures and recreational flows to protect and enhance aquatic resources.

NID proposes a dam spill cessation measure (YB-AQR1, Part 7), discussed above, that affects the rate of flow reduction following a spill event at Milton diversion dam and Bowman-Spaulling diversion dam. In combination with measures YB-RR4 and YB-RR5 (see section 3.3.5.2, *Recreation Resources*), this measure would provide at least 6 days of recreational boating opportunity during spring in spill years below Milton diversion dam on the Middle Yuba River (Bowman Development) and 5 days on Canyon Creek between Bowman-Spaulling diversion dam and the South Yuba River (Spaulding No. 3 Development). These would be the same magnitude flows that would otherwise occur in these stream

reaches in association with spill events. These flows are consistent with Forest Service condition 29, BLM condition 7, and California Fish and Wildlife recommendation 2.7, discussed previously.

In addition, NID proposes a measure (YB-RR3) that would provide fall recreational boating opportunity in about 1.4 miles of Canyon Creek between French Lake dam and Faucherie Lake. The measure would create streamflows of 120 to 150 cfs for continuous 24-hour periods; these flows would begin between September 1 and September 30 and continue until water surface elevation in French Lake drops to 6,638 feet msl (7,500 acre-feet usable storage). Proposed minimum streamflows in this reach of Canyon Creek during September and October range from 5 to 18 cfs, depending on water year type; mean and median estimated unregulated flow through this stream reach would be less than 1 cfs. Relicensing studies collected only small (about 4 inches mean length, 7.4 inches maximum) rainbow trout, which may opportunistically utilize this stream reach as rearing habitat.

Our Analysis

The spill cessation measure for Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulling diversion dam as discussed previously would ensure that changes from high flow events more naturally mimic the rate of flow decrease typical of those waters in an unregulated condition. An additional benefit of this measure would be to provide predictable high flow opportunities for recreational whitewater boating. Because these high recreational flows are in a range and duration typical of estimated unregulated flows in these stream reaches, we would not expect any adverse effects on aquatic habitat and biota. The proposed aquatic monitoring plan would provide data for evaluating the effects of high flows and flow cessation on aquatic resources.

Control of Non-native Aquatic Invasive Species

The spread of non-native invasive species and their impact on aquatic communities and native species has become more common and of concern to resources managers. Prevention of further introductions and control of existing populations of non-native invasive species is of particular concern in areas with heavy recreational use and inter-basin transfers of water.

Forest Service (condition 33) and BLM (condition 15) specify and California Fish and Wildlife (recommendation 6) recommends an aquatic invasive species management plan. NID did not include a measure for management of aquatic invasive species in the amended final license application, but submitted an alternative to the Forest Service condition.

The agencies identified four aquatic invasive species of specific concern: (1) New Zealand mudsnail; (2) Quagga mussel; (3) zebra mussel; and (4) invasive algae, rock snot. The agencies require that a plan be submitted within 1 year for management of these invasive species and prevention of their spread in project boundaries. The plan would identify aquatic invasive species BMPs, including user education and measures to remove and prevent transfer between waterbodies.

NID did not include a measure for management of aquatic invasive species in the amended final license application, but submitted an alternative to the Forest Service conditions 33 and 34. In its alternative, NID indicates that the Non-native Invasive Species Management Plan submitted on August 29, 2012, includes all aspects (table 3-199 and table 3-200) of the agencies' conditions or recommendation for management of aquatic invasive species. Aquatic invasive species are specifically addressed in the Aquatic Invasive Species Prevention Guidelines section of this Management Plan. In the filed Aquatic Monitoring Plan, NID also proposes to provide annual training to crews performing monitoring program tasks to record incidental observations of aquatic invasive species and to implement BMPs to prevent transfer between waterbodies of aquatic invasive species in conjunction with aquatic monitoring plan surveys and other project operations.

NID proposes to document incidental observation of aquatic invasive species during aquatic monitoring efforts. The observations would be reported to the Forest Service so that the Forest Service would be informed of the extent of aquatic invasive species in the areas of study conducted by NID.

Our Analysis

Some aquatic invasive species have been identified in project-affected water. An effective management plan for these species could help prevent, delay, or limit expansion of their ranges and associated regional and waterbody-specific impacts. California Fish and Wildlife considers most project waters to be at very low risk for Quagga and zebra mussel given the very low calcium concentrations observed in this region.

Because many of the best management practices for public education and control of invasive species are similar regardless of whether the invasive species are plant or animals, NID included control and management of aquatic invasive species in their Non-Native Invasive Plant Management Plan (detailed discussion in section 3.3.3.2.1, *Vegetation Management*). Management at recreation facilities and education of users is a key aspect of controlling the introduction and spread of invasive species in project waters. The Non-Native Invasive Plant Management Plan proposed by NID incorporates the key components identified by the agencies in their conditions or recommendations for management of aquatic invasive species.

The Aquatic Invasive Species Prevention Guidelines proposed by NID as part of the Non-Native Invasive Plant Management Plan incorporates the key components identified by the agencies in their conditions or recommendations. Once finalized and approved, implementation of the plan should be effective tool for reducing the risk of the dispersal of aquatic invasive species across project boundaries, in conjunction with project operations and monitoring, and should reduce the risk of dispersal by recreational users. Eradication of aquatic invasive species once established is extremely difficult; consequently, effective programs to educate users to prevent the introduction of aquatic invasive species into waters in which they do not occur are an important component of the plan.

Recording of incidental observations of aquatic invasive species as part of the proposed Aquatic Monitoring Plan (discussed previously) would provide another mechanism for identifying new incidences of invasive species in project waters which would then require implementation of appropriate best management practices described in the Non-Native Invasive Plant Management Plan.

3.3.2.3 Cumulative Effects

Water Quantity

As we discuss in sections 3.3.2.1 and 3.3.2.2.1, flows through the two projects are affected by their mutual operation and, more importantly, the exercise of water rights for diversion and use by agricultural, municipal, and commercial users in the region. These water rights are exercised by diversions made from the Middle Yuba River, Canyon Creek, South Yuba River, Bear River, and North Fork of the North Fork American River sub-basins via project facilities to satisfy consumptive water demand. Water releases to meet proposed minimum streamflows in Drum-Spaulding and Yuba-Bear project-affected stream reaches, spill cessation and management of flow fluctuations, and South Yuba River Supplemental Flows would affect the quantity of water available for diversion and power generation. Planned, unplanned, or emergency outages of a canal in one project can affect the ability of either licensee to meet proposed minimum streamflow conditions and water delivery to downstream project and non-project facilities, and stream reaches.

Non-project diversions and withdrawals of water in various stream reaches by other users affect instream flows in project-affected stream reaches. NID and PCWA are the two largest water providers with non-project diversions from project-affected stream reaches and canals. NID withdraws water for consumptive uses within the project area: (1) below the Deer Creek powerhouse on the South Fork Deer Creek; (2) below the Bear River canal diversion dam on the Bear River; (3) from Rock Creek reservoir; (4) from South canal; and (5) from Auburn Ravine. PCWA withdraws water for consumptive uses within the project area: (1) below Alta powerhouse on the Little Bear River; (2) upstream of Halsey forebay from Bear River canal; (3) from Upper Wise canal upstream of Rock Creek reservoir; (5) from Wise forebay; and (6) at several locations along South canal.

Streamflows and associated habitat in the South Yuba River downstream of the confluence with Canyon Creek are affected by multiple factors, including flows released at PG&E's Lake Spaulding dam and NID's Bowman-Spaulding diversion dam. To a lesser extent, flows are also affected by tributary flows released at the Bowman-Spaulding conduit into the following smaller feeder tributaries: (1) Texas Creek, a tributary to Canyon Creek; and (2) Clear, Fall, Trap and Rucker Creeks, the unnamed tributary below Fuller Lake, and Jordan Creek, all tributaries to the South Yuba River. Additionally, there is substantial distance from the Canyon Creek confluence to PG&E's Spaulding No. 1 and No. 2 Development (about 8.5 miles upstream) on the South Yuba River and to NID's Bowman Development (about 10.5 miles upstream) on Canyon Creek. South Yuba River flows downstream of the Canyon Creek confluence are affected by multiple other factors including, but not limited to, natural accretion, other diversions for consumptive use (e.g., the town of Washington's diversion in Canyon Creek), land use for logging or other purposes, and mining effects in or adjacent to the channel. Consequently, the reach downstream of Canyon Creek is subject to cumulative effects resulting from many different factors, including operation of the Drum-Spaulding Project.

Streamflows in Auburn Ravine are highly regulated and are cumulatively affected by numerous withdrawals and discharges by non-project diversions and water utilities (e.g., NID and PCWA) (technical memorandum 3-13, *Western Placer County Streams*; Supplement to Western Placer County Streams Technical Memorandum [April 11, 2012]), in addition to project-related releases made by PG&E from the Wise powerhouses via South canal (section 3.3.4, *Threatened and Endangered Species*; section 3.3.2.2.2, *Minimum Streamflows*). PG&E does not divert any water from Auburn Ravine and does not hold any water rights for the diversion of water from Auburn Ravine. Drum-Spaulding Project discharges from South canal significantly augment flows in Auburn Ravine between the South canal release (RM 27.6) and PCWA's Auburn Tunnel (RM 26.4) above estimated unregulated baseflows, enhancing coldwater aquatic habitat in the stream reach below this release point. Except during major runoff events, estimated unregulated (without hydropower operations and other consumptive water deliveries and withdrawals) baseflow in this reach of Auburn Ravine would typically be 5-10 cfs, similar to proposed minimum streamflows. The effect of PG&E's water delivery is greatest in Auburn Ravine upstream of the discharge from Auburn Tunnel and before numerous other downstream non-project withdrawals and releases diminish the influence of PG&E's discharges (technical memorandum 3-13, *Western Placer County Streams*). PG&E's hydroelectric releases from South canal (up to 80 cfs) account for about 27 percent of the total volume of water releases to Auburn Ravine that occur upstream of NID's Auburn Ravine I diversion dam (technical memorandum 3-13, *Western Placer County Streams*). While water deliveries associated with hydropower operations account for a portion of flows in Auburn Ravine below the Auburn Ravine I diversion dam, other sources associated with consumptive water deliveries cumulatively account for more than 70 percent of the flow in this stream reach.

As discussed previously, the primary purpose of much of the infrastructure of both projects is for transfer and delivery of water to agricultural, municipal, and industrial users in the region. The exercise of legally established water rights by NID and PCWA for delivery to meet water demand in their service areas is likely to continue and increase irrespective of hydroelectric operations of the Drum-Spaulding

and Yuba-Bear Projects. PG&E's and NID's proposed flow and operational measures consider the competing demands and cumulative effects of hydroelectric generation, water delivery, and aquatic resources, and would minimize cumulative effects. General measures proposed by PG&E and NID (DS-GEN3, DS-AQR6, and YB-GEN6) to develop and implement a coordinated operations plan between the two projects would minimize conflicted operations and cumulative effects on water quantity associated with mutual operations. Although environmental flow measures and power operations are likely to remain similar over the duration of the project licenses, non-project consumptive water demand (agriculture, municipal, and commercial) is projected to increase during this same period. Increases in water demand and exercising of water rights to meet that demand would cumulatively affect the ability of PG&E and NID to comply with minimum streamflow in some stream reaches, particularly during warm, dry water years when non-project water demand could be greater.

PG&E and NID used an operations model to evaluate the effect of various project flow alternatives on hydroelectric generation and the ability to comply with project-wide minimum flows and to meet water delivery obligations of NID and PCWA (Supplement 4 to the final license application, PG&E August 30, 2012). The model was run using two water delivery scenarios: one assumed current water demand based on water delivery by NID and PCWA for water years 2001-2009; the second used water demand projected 50 years in the future, 2062. The various operating scenarios were applied to the water year conditions for the period of record, 1976-2008. The operations model indicates that, under the existing license conditions and water demand, both NID and PCWA experienced water deficits in 2 years (1977 and 1978) of the 33-year period of record (section 3.2 of Supplement 4 to the final license application, PG&E August 30, 2012). Modifying project operations to simulate proposed flows measures (minimum streamflows, spill cessation and management of flow fluctuations, and South Yuba River Supplemental Flows) with current water demand reduced hydroelectric generation by about 10 percent and increased water deficit by 1 to 12 percent in 1977 and 1978 (section 4.2 of Supplement 4 to the final license application, PG&E August 30, 2012). Using future water demand further reduced generation by about 4 percent and resulted in water deficits of 1 to 89 percent for NID in all but 8 of the 33-year period of record; PCWA would experience water deficits in only 3 years of the period of record (section 5.2 of Supplement 4 to the final license application, PG&E August 30, 2012). In addition, PG&E would be unable to meet the proposed minimum streamflow requirements in several project-affected stream reaches in western Placer County in drier years. These model results quantify the cumulative effects of the Drum Spaulding and Yuba-Bear Projects and of increasing demands (environmental, hydropower, and water supply) on the limited available water supply.

As discussed in section 3.3.2.2.2, *Minimum Stream Flows*, NMFS has recommended future increases in minimum streamflows in the Middle Yuba and South Yuba Rivers during late spring and summer to support the potential reintroduction of spring-run Chinook salmon and Central Valley steelhead in the upper Yuba River Basin above Englebright dam. If and when reintroduction of either of these species occurs, the operations model results indicate that the proposed flow increases are likely to further stress the water delivery system, reduce power generation, and could lead to non-compliance with minimum streamflows in other project-affected stream reaches, particularly in downstream project areas (e.g., Auburn Ravine and Mormon Ravine) and during drier years.

Water Temperature

In regulated systems, such as the Drum-Spaulding and Yuba-Bear Projects, cold water from snowmelt is captured and stored in project lakes and reservoirs and managed discharge of cold water to downstream reaches from low-level release structures is a key to maintaining cold water habitat in these stream reaches throughout the summer. Timing of inflow and stratification, volume of the available cold water pool, timing and size of downstream releases and diversions, and depth of the low-level outlet and

powerhouse intakes all influence the quantity of cold water available to maintain downstream habitat and how late into the summer adequate cold water is available.

Given the complex and interconnected features of the Drum-Spaulding and Yuba-Bear Projects, water diversion, water transfer, and releases to project-affected reaches cumulatively affect flow-related environmental conditions such as water temperature. In addition, other non-project consumptive diversions, withdrawals, and discharges in some project-affected reaches further complicate the ability to sustain flow and water temperature goals beyond the immediate stream reaches below project release structures. Although environmental flow measures and power operations are likely to remain similar over the duration of the project licenses, non-project consumptive water demand (agriculture, municipal, and commercial) is projected to increase during this same period. Increases in water demand and exercising of water rights to meet that demand would cumulatively affect minimum streamflow and water temperatures in some stream reaches, particularly during warm, dry water years when non-project water demand could be greater, resulting in water temperature increases.

Water temperature and operations modeling by PG&E and NID demonstrate that with cold water releases from project reservoirs under existing license conditions and proposed flow measures, water temperatures remain cooler later into the summer than would exist under estimated unregulated flow conditions. This is particularly apparent in lower elevation stream reaches that can provide transitional aquatic habitat supporting both cold water and warmer water species (e.g., lower reaches of the Middle and South Yuba Rivers). Flow manipulations (e.g., increasing minimum streamflows, decreasing the rate of spill recession from peak flows, seasonal supplemental flows) at project facilities that depend on releases from the cold water pool can be used to enhance aquatic habitat for some species, but could concurrently put other species at risk. The proposed flow measures would preserve the coldwater resources in the project reservoirs for protection and maintenance of downstream aquatic habitat and balance the thermal requirements of resident trout and foothill yellow-legged frog in key reaches of the Middle Yuba River, South Yuba River, Canyon Creek, and Bear River. The benefits and risks of coldwater releases to various aquatic resources and users is further cumulatively affected by other non-project diversions, withdrawals, discharges, and water supply demands in many of these project-affected stream reaches not controlled by PG&E and NID.

As discussed in the previous section, the operations and water temperature models were used by PG&E, NID, and the relicensing stakeholders to balance multiple demands on the coldwater pools in the numerous project lakes and reservoirs. There is minimal water storage in the Bear River upstream of Rollins reservoir, base flows upstream of Drum afterbay are relatively low, and the ability to maintain flows and water temperatures is affected by operations of the Drum-Spaulding Project's Drum canal, South Yuba canal, Drum No. 1 and No. 2 Development, and Alta Development. The ability of NID to deliver minimum streamflows in the Bear River below Yuba-Bear's Dutch Flat afterbay dam is dependent on those Drum-Spaulding operations upstream. Without the transfer of water from PG&E's Spaulding No. 1 and No. 2 Development to the Bear River flows in the Bear River upstream of NID's Rollins reservoir would be much lower, particularly during summer and fall, and water temperatures would be higher. Releases by NID from Rollins dam to the lower Bear River would be managed to comply with minimum streamflows and sustain cold water habitat in the Bear River, but also affect the ability of PG&E to divert water to the Bear River canal to meet non-project consumptive water supply demand, minimum stream flows in several western Placer County streams, and reliably generate hydropower.

PG&E and the relicensing stakeholders propose and specify minimum streamflows released from the Wise and Wise No. 2 Development to Auburn Ravine via South canal to protect and enhance cold water habitat for resident rainbow trout. Without these releases summer flows between this release location and Auburn Tunnel would be very low. Cold water diverted by PCWA from the North Fork American River via the non-project Auburn Tunnel diminishes the downstream influence of PG&E's

releases from South canal about 1 mile upstream. In the intervening stream reach non-project discharges and diversions diminish the influence of PG&E's release from South canal for the benefit of aquatic species. Numerous water deliveries, diversions, and withdrawals in lower Auburn Ravine downstream of Auburn Ravine 1 diversion dam have further cumulative effects on water flow and temperature.

Minimum streamflows released to the upper reaches of the Drum-Spaulding and Yuba-Bear project and non-project consumptive water diversions cumulatively affect discharges to Mormon Ravine at the Newcastle header box and powerhouse, and consequently could have cumulative effects on the cold water storage pool of Folsom Lake. Flows in Mormon Ravine are dominated by flows from the South canal via the Newcastle Development and cumulatively influence the size and persistence of the cold water pool in Folsom Lake, in conjunction with other non-project upstream projects and diversions in the American River watershed from: (1) the Middle and North Fork American Rivers (Middle Fork American River Project [FERC No. 2079-069]); (2) Upper American River Project (FERC No. 2101); (3) Georgetown Divide Public Utility District's Stumpy Meadows Project (a non-FERC regulated project); (4) Foresthill Public Utility District's Sugar Pine Dam Project, which diverts flow from a tributary to the North Fork American River; (5) PCWA's Pulp Mill Canal Diversion Dam Project, which diverts flows from a tributary to the North Fork American River; and (6) PCWA's American River pump station, which diverts water from the North Fork American River to Auburn Ravine via the Auburn Tunnel. Operation of each of these projects is expected to be similar in the future compared to current operations.

Operation of the Drum-Spaulding and Yuba-Bear Projects, in addition to other non-project facility operations cumulatively affects minimum streamflows that sustain cold water temperatures and aquatic habitat. In order to minimize the cumulative effect on water temperature and streamflow, PG&E, NID, and relicensing stakeholders have proposed measures to ensure collaboration and cooperation between the operations of these two projects. Requirements for a Coordinated Operations Plan (BLM condition 2) and Coordination of Operations at Rollins Reservoir to Comply With Bear River Minimum Streamflows (BLM condition 3 and Forest Service 10(a) recommendation 2) would help ensure that this balance is achieved. In addition, the annual consultation process (Forest Service condition 1, BLM Drum-Spaulding condition 23 and Yuba-Bear condition 42, and Reclamation condition b.1) provides stakeholders with a vehicle for coordination, collaboration, and review of monitoring data and compliance with proposed measures and specified conditions to ensure that these cumulative effects on diverse resources are balanced between project operations, protection and enhancement of cold water aquatic resources, and non-project water users and water rights.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

3.3.3.1.1 Vegetation

Distinct vegetation types in the vicinity of the projects are distributed along an elevation gradient creating bands with characteristic or dominant species. These bands somewhat overlap and intergrade with each other forming transition zones on their outer edges.

Vegetation in the foothills (below 2,000 feet msl) is dominated by an overstory of gray pine and ponderosa pine, with a mixture of small stands of hardwoods including canyon live oak, interior live oak, and blue oak, and low-elevation chaparral shrubs such as wedgeleaf ceanothus, manzanitas, and coffeeberry. The forest is occasionally interrupted by patches of non-native annual grasslands dominated by a variety of bromes with some medusahead grass. In some areas, pure stands of ponderosa pine exist where the conifer has been planted following fires and/or logging. In riparian areas, black cottonwood, white alder, and valley oak are common.

At mid elevations (between 2,000 and 5,000 feet msl), dominant vegetation includes incense cedar, Douglas fir, white fir, madrone, and sugar pine. Additionally, significant stands of Brewer's oak occupy south-facing slopes and areas of annual grasslands. Chaparral species include whiteleaf manzanita, greenleaf manzanita, mountain whitethorn, wedgeleaf ceanothus, deerbrush, and poison oak. Riparian areas are dominated by white alders, maple, and willows. In addition, the mid-elevation band includes several outcrops of habitat characterized by serpentine soil. Dominant plants in these areas are leather oak, gray pine, and wedgeleaf ceanothus. Additional serpentine indicators in these areas include milkwort jewelflower and yellow pincushion.

At higher elevations (above 5,000 feet msl), the forested areas are dominated by an incense cedar, red fir, white fir, and Jeffrey pine overstory. Lodgepole pines exist in moist soils in meadows and along shorelines. Black oak, willow, quaking aspen, and mountain alder are common deciduous trees and may form a subcanopy beneath the conifer overstory. Some areas are barren, devoid of vegetation due to rocky and steep terrain with little to no soil layer. The shrub layer is dominated by mountain whitethorn, huckleberry oak, pinemat manzanita, and bush chinquapin.

The main disturbance affecting upland vegetation in the area of the projects is fire. The Sierra Nevada Forest Plan Amendment (Forest Service, 2004, as cited in PG&E, 2011a and NID, 2011a) documents a trend of increasing acres burned on the National Forests within the Sierra Nevada Ecoregion from 1970 through 2003. The last significant fire in the vicinity of the projects occurred near Lake Valley reservoir in 2001 and burned close to 2,500 acres. The fire was not related to the operation and maintenance of either project.

Riparian and Wetland Vegetation

To provide baseline information on riparian and wetland vegetation, PG&E and NID reviewed information from Forest Service stream survey data sheets for the period of 1975 to 2001 and riparian inventory data sheets available for the North Fork American River sub-basin; a series of watershed maps developed by the Nevada County Planning Department; FWS National Wetlands Inventory maps; and low-elevation helicopter video imagery for each study site to identify the distribution, extent, and class of riparian and wetland habitat in the area of the projects.

Additionally, the applicants conducted Proper Functioning Condition assessments of 10 riparian habitat sites and 7 wetlands. The sites were collaboratively selected with other relicensing stakeholders to represent the range of riparian habitat and wetlands that could be affected by the projects. The applicants also collected vegetative transect data in three riparian areas for tree, shrub, and herbaceous species.

The Proper Functioning Condition assessment protocol generally defines a properly functioning riparian area as one with adequate vegetation, landform, or large woody debris that:

- Dissipates stream energy associated with high water flow, thereby reducing erosion and improving water quality;
- Filters sediment, captures bedload, and aids in flood plain development;
- Improves flood-water retention and groundwater recharge;
- Develops diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and

- Supports greater biodiversity.

Under the Proper Functioning Condition assessment methodology, a site is rated as Properly Functioning if it meets all or most checklist criteria in accordance with site capability and potential. A site is rated as Functional–At Risk if it meets all or most checklist criteria, but certain attributes or processes are not present or otherwise suggest a probability of site degradation during high-flow events. A site is rated as Nonfunctional when many checklist criteria are not met and the area clearly lacks the elements of the criteria listed above (PG&E and NID, 2011a).

Seven of the ten riparian habitat sites and five of the seven wetlands were rated as Properly Functioning. The remaining sites, described below, were rated Functional–At Risk. Functional–At Risk riparian habitat sites were identified at the Fordyce Lake dam reach and Bear River reach no. 2 at the Drum-Spaulding Project and apesticidet the Dutch Flat afterbay dam reach at the Yuba-Bear Project. Functional–At Risk wetland sites were identified at Bear River reach no. 2, wetland RM 35 and Lower Rock Lake dam reach no. 1, and wetland RM 2.8 at the Drum-Spaulding Project. To make these determinations, the site-specific attributes and processes of hydrology, vegetation, and erosion/deposition for each site were considered along with historical site information and overall site reconnaissance. Proper Functioning Condition ratings are summarized in table 3-201, and riparian and wetland habitat sites with Functional–At Risk ratings are discussed below.

Table 3-201. Riparian and wetland habitat study sites and Proper Functioning Condition ratings for the Drum-Spaulding and Yuba-Bear Projects. (Source: PG&E, 2011a; NID, 2011a)

Study Site Name	Proper Functioning Condition Rating
Riparian Habitat Study Sites	
Drum-Spaulding Project	
Fordyce Lake dam reach	Functional–At Risk
Bear River reach no. 2	Functional–At Risk
Lake Valley reservoir dam reach	Properly Functioning
Lower Rock Lake dam reach 3.1	Not applicable ^a
Lower Rock Lake dam reach 2.8	Not applicable ^a
Yuba-Bear Project	
Jackson Meadows dam reach	Properly Functioning
Jackson Meadows dam reach just upstream of the Milton diversion dam impoundment	Not applicable ^a
Milton diversion dam reach	Properly Functioning
Faucherie Lake dam reach	Properly Functioning
Bowman-Spaulding diversion dam reach	Properly Functioning
Dutch Flat afterbay dam reach	Functional–At Risk
Drum-Spaulding and Yuba-Bear Projects	
South Yuba River reach no. 4	Properly Functioning
Bear River Canal diversion dam reach	Properly Functioning

Table 3-201. Riparian and wetland habitat study sites and Proper Functioning Condition ratings for the Drum-Spaulding and Yuba-Bear Projects. (Source: PG&E, 2011a; NID, 2011a)

Study Site Name	Proper Functioning Condition Rating
Wetland Habitat Study Sites	
Drum-Spaulding Project	
Meadow Lake wetland	Properly Functioning
White Rock Lake wetland	Properly Functioning
White Rock Lake dam reach No. 2, wetland RM 2.2	Properly Functioning
Bear River reach no. 2, wetland RM 35	Functional–At Risk trending upward
Lower Rock Lake dam reach No. 1, wetland RM 2.8	Functional–At Risk trending upward
Lower Rock Lake dam reach No. 1, wetland RM 3.1	Properly functioning
Yuba-Bear Project	
Jackson Meadows dam reach, wetland RM 46.4	Properly functioning

^a Vegetative transect only.

Drum-Spaulding Project

Fordyce Lake Dam Reach, Riparian Habitat—Fordyce Lake dam reach is a 10.5-mile-long reach between Fordyce Lake dam and Lake Spaulding. The channel is mostly confined within bedrock walls and has numerous falls and gorges that define the overall character. Substrate is dominated by immobile material, and banks are bounded by bedrock, although some banks are composed of soils (< 15 percent of the site). These soils are loamy, indicating they are significantly influenced by the decomposition of organic matter and are not the result of recent sedimentation. Five plant associations occur within the study site and include mountain alder, incense cedar, red fir, huckleberry oak, and pinemat manzanita. Riverine and palustrine wetland systems occur within the study site. The riverine wetland encompasses about 4.3 acres, and palustrine wetlands encompass about 1.14 acres and consist of unconsolidated bottom wetland. Palustrine unconsolidated bottom wetlands are scattered intermittently.

The riparian area associated with this reach was classified as Functional–At Risk. Undercutting occurs in some areas (< 15 percent of overall reach length) due to 1997 elevated flood flows. Existing flows may be causing continued undercutting, and riparian vegetation has not become established enough in these areas to prevent further erosion. Throughout the majority of the reach, energy associated with large flow events is dissipated by bedrock and boulder substrate. Although there is limited riparian vegetation in these areas, it meets the potential for an area dominated by such substrates. However, some areas did not meet riparian potential, such as where soil banks were present in small, intermittent pockets throughout the reach and at a relatively short upstream section of the study site (<15 percent total). Surveys indicate that riparian vegetation was not present in these areas with enough vigor or root stability to withstand high flow events, although these areas have the potential to support a more developed riparian community. Erosion undercutting of these banks was observed, and vegetation in these areas had exposed roots. These areas contributed to the Functional–At Risk rating because they do not meet their potential, although they comprise only a small percentage of the overall site.

Bear River Reach No. 2, Riparian Habitat—Bear River reach no. 2 is about 1.65 miles long, at an approximate elevation of 4,000 feet msl. This reach is functionally affected by both the Drum-Spaulding and Yuba-Bear Projects. Bear River reach no. 2 occurs near the headwaters of the Bear River drainage. In the upper section, the stream is confined cohesive alluvial sediments with exposed bedrock in the channel. The upper meadow has springs and subsurface flow that are not surficially connected to the channel. In the middle section, the Bear River flows through a terrace and includes a short berm composed of cobbles and boulders. The channel is steep through this portion of the meadow, and there is no apparent hydraulic connection between the channel and the adjacent meadow. The lower section is a meandering stream with fine-grained banks, and bedrock is present along this portion. Field surveys show a substantial increase in riparian vegetation along the side channels and woody vegetation along the main stream channel since 1939. Vegetation consists of riparian species of white alder trees with an understory of mountain alder and various willows. Vegetation throughout the main and side channel stabilizes the banks and limits lateral movement. In addition, California State Highway 20 traverses the Bear River and limits stream channel movement.

The riparian area associated with Bear River reach no. 2 was classified as Functional—At Risk with an upward trend. Although the channel is incised in the upper and middle portions, with intermittent bank failures in the middle meadow, the study site has many of the characteristics included in the Proper Functioning Condition definition, which contributed to the upward trend rating. There are active and frequent flood plains in the lower sections of reach. Localized flood plains show connectivity to the main channel, and a high water table, hydric soils, and fine-grained deposition suggest frequent inundation. More than 95 percent cover of woody and herbaceous riparian vegetation supports bank stability, dissipates energy, and forms root masses capable of withstanding high-flow events. Twenty-nine wetland indicator species were observed and may denote a healthy distribution of anaerobic soil and groundwater movement. There are no fan deposits or braids from upland sediment sources and no indication of current excessive erosion or deposition. Regulated flows in this reach are larger than would be expected given the small drainage area; the reach is used for spill conveyance during winter storm conditions and for conveyance into the Bear River watershed during the winter and spring of wetter water years.

Bear River Reach No. 2, Wetland RM 35—Bear River reach no. 2, wetland RM 35 occurs about 2 miles southwest of Lake Spaulding, encompasses about 266.70 acres, and is located at about 4,520 feet msl. This reach is functionally affected by both the Drum-Spaulding and Yuba-Bear Projects. This wetland includes sections associated with the river and sections created by upslope sources. Sources of water include seeps, springs, the Bear River, and seasonal inflow from streams that drain adjacent uplands. Eight plant associations occur within the wetland, including sedge, rush, white alder, bulrush, broadleaf cattail, willow, wet meadow, and dry meadow. The wetland system is palustrine and consists of about 234.68 acres of emergent wetlands, 17.80 acres of scrub-shrub wetlands, and 14.22 acres of forested wetlands. Historical aerial photographs indicate the overall extent of this wetland has remained the same with some increases in conifers, shrub, and forest wetland vegetation. Bear valley has a long history as a pasture for livestock and, until the 1990s, was heavily grazed. The emergence of woody vegetation throughout the stream margins is most likely related to the general decline of grazing pressure.

This wetland was rated as Functional—At Risk, with an upward trend. The natural surface or subsurface flow patterns appear to have been altered by historic disturbance from grazing. Trampling and compaction eliminate vegetation, thereby increasing runoff and erosion, potentially resulting in stream-channel down-cutting. Several factors contributed to the upward trend rating of this wetland. Cattle have been removed from the wetland, and stream bank restoration measures have been implemented. Reduced grazing pressure and natural succession have improved meadow conditions. The meadow vegetation is primarily supported by other sources of water, including seeps, springs, and intermittent and perennial streams from the surrounding mountain slopes.

Lower Rock Lake Dam Reach No. 1, Wetland RM 2.8—Lower Rock Lake dam reach no. 1, wetland RM 2.8 encompasses about 39.03 acres and is about 1.6 miles downstream of Lower Rock Lake dam at an elevation of about 6,000 feet msl. The wetland is bisected by Texas Creek, which is controlled by the operation of Lower Rock Lake dam. Other sources of water include seeps, springs, and inflow from several small streams draining the upland slopes northeast and southeast of the site. Nine plant associations occur within the wetland and include sedge, rush, corn lily, mountain alder, willow, wet meadow, dry meadow, lodgepole pine, and quaking aspen. The wetland system is palustrine and encompasses about 36.50 acres of emergent wetlands, 2.24 acres of scrub-shrub wetlands, and 0.29 acre of forested wetlands.

This wetland was rated as Functional–At Risk, with an upward trend, because of three main issues. First, this meadow was heavily grazed by sheep and cattle for most of the twentieth century, which has altered the natural surface or subsurface flow patterns leading to stream channel down-cutting from trampling and vegetation eliminated by compaction. Grazing also appears to have reduced woody vegetation in stream channels. Though the site is seasonally grazed by cattle and used for horse pasture late in the year following plant development, the site no longer is subject to the pressures it had experienced in the past, which may have contributed to the ongoing recovery. Restoration measures, such as the reduced grazing pressure and the placement of a grade control structure at the outlet, indicate that the wetland is now trending toward recovery. Second, plant species present did not fully indicate maintenance of riparian-wetland soil moisture characteristics. Prolonged saturation and hydric soils are absent from portions of the wetland. The wetland may drain quickly enough to establish wetland plants but does not remain inundated for a long enough duration to establish hydric soil or hydrology indicators. Third, adequate vegetative cover was not present to fully protect the soil surface and dissipate energy during overland flow events. The inability to dissipate energy during overland flow events pertains mostly to the distribution channels and not to the main Texas Creek channel. The distribution channels have been more severely affected by grazing animals and show more evidence of scour and bank failure.

Yuba-Bear Project

Dutch Flat Afterbay Dam Reach, Riparian Habitat—The Dutch Flat afterbay dam reach is a 5.4-mile section of the Bear River between the Chicago Park powerhouse at the downstream end and Dutch Flat afterbay dam at the upstream end. Vegetative cover increased from 1939 to 1977 in areas directly adjacent to the main channel flows. Field observations indicated that the vegetation at the water's edge is dominated by willow and white alder shrub. Riverine and palustrine wetland systems occur within the study site. The riverine wetland encompasses about 2.73 acres, and the palustrine wetlands encompass 9.18 acres of palustrine scrub-shrub and unconsolidated bottom.

The riparian area associated with this reach was classified as Functional–At Risk with an upward trend. Historic sedimentation associated with mining deposits and large historic floods have affected the functional capacity of the riparian area. Depositional mine tailings have formed terraces that prevent the river from being hydraulically connected to the banks, and upland species are present on these terraces. The coarse deposits and extensive sediment supply have also caused channel braiding. The riparian sediments are also composed of these loosely consolidated and coarse deposits and are non-cohesive and unstable. In areas where riparian habitat is establishing, it cannot withstand high flows because fine sediments have not accumulated and soils have not developed in the coarse material, which prevents strong root-holds. Under normal flows, riparian vegetation showed a trend toward becoming more established and providing positive riparian habitat characteristics, which contributed to the upward trend rating.

Noxious Weeds

Noxious weeds as used here are plant species listed as noxious weeds by Tahoe National Forest or the California Department of Food and Agriculture. To identify noxious weeds and invasive plants with the potential to occur in the vicinity of the projects, PG&E and NID reviewed Tahoe National Forest survey data and performed surveys for these noxious weeds and others that may occur in the project site. Table 3-202 lists the 16 plant species identified at the Drum-Spaulding and Yuba-Bear Projects.

Table 3-202. Noxious weeds/invasive plant species identified within the Drum-Spaulding and Yuba-Bear Project boundaries. (Source: PG&E, 2011a; NID, 2011a; and Calflora, 2012)

Common Name	2007 California Department of Food and Agriculture Rating ^a
Barbed goatgrass	B
Tree of heaven	C
Italian thistle	C
Slenderflower thistle	C
Tocalote	C
Yellow starthistle	C
Skeleton weed	A
Scotch broom	C
Common fig	Not rated
French broom	C
Klamath weed	C
Tall whitetop	B
Spanish broom	Not rated
Johnson grass	C
Medusahead	C
Canada thistle	B

^aCalifornia Department of Food and Agriculture ratings:

A = Eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.

B = Eradication, containment, control, or other holding action at the discretion of the commissioner. State endorsed holding action and eradication only when found in a nursery.

C = Action to retard spread outside of nurseries at the discretion of the commissioner; reject only when found in a crop seed for planting or at the discretion of the commissioner.

A total of 994 noxious weed occurrences, representing 16 plant species, were found during the applicants' field surveys. Of these occurrences, 76 were on NFS lands—28 within the Drum-Spaulding Project boundary and 48 within the Yuba-Bear Project boundary—and 45 were on BLM land within the Yuba-Bear Project boundary (PG&E and NID, 2011d).

In general, noxious weeds were more abundant on private lands at lower elevations and were primarily found along roads, canals, transmission lines, and in campgrounds within the project areas. The most common are Klamath weed, skeleton weed, Scotch broom, and yellow starthistle. Where found, these weeds are continuous in and out of the project areas.

PG&E's informal noxious weed control program includes using herbicides on PG&E property around dams, canals, and roads; pressure washing and cleaning heavy equipment rentals prior to delivery to PG&E; and certifying rock and road base are weed-free before delivery. NID does not have a noxious weed control program. However, vegetation management conducted as part of project O&M may indirectly target some occurrences of noxious weeds.

Special Status and Special Interest Plant and Fungi Species

PG&E and NID consulted with agencies and literature to develop a list of special status plant species with the potential to occur in the Drum-Spaulding and Yuba-Bear Project areas. Field botanical surveys were conducted to determine the presence of special status plant species in the project areas. A total of 118 occurrences of 13 special status plants, described below, were identified within the study area; 74 occurrences were within the Drum-Spaulding Project boundary, and 44 were within the Yuba-Bear Project boundary (table 3-203). No plant species listed under the California Endangered Species Act were found in the project boundaries (PG&E and NID, 2011d). Federally listed plant species are discussed in section 3.3.4, *Threatened and Endangered Species*. Webber's ivesia, a candidate for listing under the ESA, is described below.

Congdon's onion is a perennial herb native and endemic to California found at elevations from 1,000 to 5,000 feet msl, with a flowering period ranging from April to June. Habitats in which this species can be found include chaparral, cismontane woodlane, and serpentine soils. Seven occurrences of Congdon's onion were found in the Drum-Spaulding Project area, and four occurrences were found in the Yuba-Bear Project area. In the Drum-Spaulding Project area, four occurrences were located adjacent to Drum Powerhouse Road, one occurrence was located beneath the Deer Creek-Drum transmission line, and two occurrences were located along Hillcrest Road, which accesses the Bear River canal. All occurrences were on serpentine soils with wooly sunflower, wedgeleaf ceanothus, and milkwort jewelflower. One occurrence showed signs of disturbance, and two occurrences had noxious weeds in the vicinity. All occurrences of Congdon's onion in the Drum-Spaulding Project area appeared healthy, with 10 to 20 percent in flower. In the Yuba-Bear Project area, all occurrences were found on Forest Service land adjacent to the Dutch Flat conduit. All occurrences were located on serpentine outcrops. Dominant species in the area included California bay, wedgeleaf ceanothus, and canyon live oak. Occurrences below the Dutch Flat conduit had noxious weeds among or adjacent to them and were subject to erosion. All occurrences of Congdon's onion in the Yuba-Bear Project area appeared healthy, with 30 percent or more of the plants in flower (PG&E and NID, 2011d).

Table 3-203. Special status and special interest plants identified in the Drum-Spaulding and Yuba-Bear Project boundaries. (Source: PG&E and NID, 2011d)

Common Name	Drum-Spaulding Project	Yuba-Bear Project	Special Status Designation ^a
Special Status Plants			
Congdon's onion	7	4	FSW
Sanborn's onion	1	--	FSW
Scalloped moonwort	1	--	FSS, CNPS 2
Wooly-fruited sedge	--	1	CNPS 2
Brandegees clarkia	46	18	FSS, BLM-S, CNPS 1B
Coralroot orchid	--	2	CNPS 2
Roundleaf sundew	--	2	FSW
Humboldt lily	12	5	FSW, CNPS 4
Northern bugleweed	--	1	CNPS 4
Sierra starwort	3	7	CNPS 4
Water bulrush	--	1	CNPS 2
Rocky Mountain chickweed	3	2	CNPS 4
Felt-leaved violet	1	1	CNPS 4
Total Number of Occurrences	74	44	--
Special Interest Plants			
Quaking aspen	38	23	--
Elderberry	26	--	--

^a Status Designations:

BLM-S = BLM sensitive plants

CNPS 1B = California Native Plant Society list, endangered in California and elsewhere

CNPS 2 = California Native Plant Society list, rare/threatened/endangered in California only

CNPS 4 = California Native Plant Society list, limited distribution, watch

FSS = Forest Service sensitive species

FSW = Tahoe National Forest watch list species

Sanborn's onion is a perennial herb endemic to California found at elevations from 1,000 to 5,000 feet msl, with a flowering period ranging from April to June. Habitats in which this species can be

found include chaparral, cismontane woodland, and serpentine soils. One occurrence of Sanborn's onion was found in the Drum-Spaulding Project area along the Bear River canal. Dominant species in the area included California bay, Douglas fir, and manzanita. The Sanborn's onion occurrence appeared to be healthy, with more than 25 percent in flower and no visible disturbances (PG&E and NID, 2011d).

Scalloped moonwort is a fern native to California found at elevations over 4,000 feet msl, with a flowering period ranging from June to September. Habitats in which this species can be found include lower montane coniferous forests, meadows and seeps, marshes and swamps, and moist/riparian areas. One occurrence of scalloped moonwort was found in the Drum-Spaulding Project area adjacent to Lake Valley reservoir. Dominant species in the area were incense cedar, Jeffrey pine, white fir, and huckleberry oak. The scalloped moonwort occurrence appeared to be healthy, with well-developed fertile leaves and no visible disturbances (PG&E and NID, 2011d).

Wooly-fruited sedge is a perennial herb native to California found in lake margin, marsh, bog and fen, and edge habitats (Calflora, 2012). One occurrence of wooly-fruited sedge was found in the Yuba-Bear Project area adjacent to the Bowman-Spaulding transmission line, on floating vegetation mats in a pond-like wetland. Dominant species in the area included bog blueberry, buck-bean, and bog laurel. The wooly-fruited sedge occurrence appeared healthy, with the majority in flower or fruit. Evidence of dumping, possibly historic, was present on the western side of the area of occurrence (PG&E and NID, 2011d).

Brandegee's clarkia is an annual herb native and endemic to California found at elevations from 239 to 3,001 feet msl, with a flowering period ranging from May to July. Habitats in which this species can be found include chaparral and cismontane woodlands. Forty-six occurrences of Brandegee's clarkia were found in the Drum-Spaulding Project area, and 18 were found in the Yuba-Bear Project area. In the Drum-Spaulding Project area, occurrences were along the Bear River canal, Bear River Canal Access Road, and Wise Forebay-Newcastle Powerhouse Road. All occurrences were located in openings with annual grasses; five of the occurrences were found in serpentine outcrops. Common species found in these areas included poison oak, black oak, canyon live oak, gray pine, and Douglas fir. Several of the occurrences appeared disturbed by off-highway vehicle use, road use and maintenance, and herbicide application. All but one occurrence in the Drum-Spaulding Project area appeared healthy with the majority of individuals in flower or fruit. In the Yuba-Bear Project area, 18 occurrences were located on private land and two on BLM land at Rollins reservoir and Dutch Flat afterbay. All occurrences were in openings in oak woodland, most commonly with annual grasses, poison oak, wooly sunflower, and field bindweed. The majority of occurrences had noxious weeds among or adjacent to them. Nearly half of the occurrences showed signs of disturbance, from road maintenance, herbicide application, recreation use, fire, or non-project transmission line maintenance. The majority of Brandegee's clarkia occurrences in the Yuba-Bear Project area appeared healthy and were near full flowering (PG&E and NID, 2011d).

Coralroot orchid is a perennial herb native to California found in meadow, edge, and wetland habitats (Calflora, 2012). Two occurrences of coralroot orchid were found in the Yuba-Bear Project area. One occurrence was located on Forest Service land at the Milton diversion dam impoundment, and the second was located at Bowman Lake. The first occurrence was located on mesic swales in an extensive wetland dominated by lenticular sedge, twotooth sedge, lance-leaf self-heal, and Macloskey's violet. The second occurrence was located in a mesic opening, with rattlesnake plantain, trailplant, creeping snowberry, and sickle-keeled lupine. Both occurrences appeared healthy, with 70 percent flowering and 20 percent in fruit in the first occurrence and all plants in fruit in the second occurrence (PG&E and NID, 2011d).

Roundleaf sundew is a perennial herb native to California found in wet areas below 8,000 feet msl, with a flowering period ranging from June to September. Two occurrences of roundleaf sundew

were found in the Yuba-Bear Project area. The first occurrence was located in a small wetland by the Bowman-Spaulding conduit on Forest Service land. Plants found in this area included mountain alder, yellow willow, and black cottonwood. The second occurrence was located in a wetland directly across from the Bowman-Spaulding transmission line. Dominant vegetation in this area included bog blueberry, buck-bean, and bog laurel. The first occurrence appeared healthy, with about 30 percent of the plants in flower, although there was evidence of off-highway vehicle use in the surrounding roadways and river channels. The second occurrence also appeared healthy, with about 60 percent of the plants in flower. The west side of the wetland in the second occurrence had significant amounts of garbage from dumping, some of which was possibly historic (PG&E and NID, 2011d).

Humboldt lily is a perennial herb native and endemic to California found at elevations from 1,500 to 3,500 feet msl, with a flowering period ranging from May to July. Habitats in which this species can be found include chaparral, cismontane woodland, lower montane coniferous forest, and openings. Twelve occurrences of Humboldt lily were found in the Drum-Spaulding Project area, and five were found in the Yuba-Bear Project area. In the Drum-Spaulding Project area, all occurrences were located on private land adjacent to the Upper Wise canal, Bear River canal, and Bear River Canal Access Roads. Occurrences were in areas of oak woodland with a few conifers, a generally thick shrub layer, and a sparse herbaceous layer. Dominant species found in association with Humboldt lily occurrences in the Drum-Spaulding project area included black oak, blue oak, canyon live oak, poison oak, deer brush, tonyon, and wedgeleaf ceanothus. Brush cutting was a visible disturbance around two of the occurrences, and noxious weeds grew in the vicinity of five occurrences. All occurrences in the Drum-Spaulding project area showed signs of grazing but appeared healthy. In the Yuba-Bear Project area, all occurrences were located in direct proximity to Rollins reservoir, with one located inside Orchard Springs Campground. Dominant species in the areas of occurrence included Douglas fir, black oak, poison oak, mock orange, and deer brush. All occurrences in the Yuba-Bear Project area showed signs of grazing, and all but one had noxious weeds among or in the vicinity of the occurrence. Two occurrences showed visible disturbance due to road and recreation use or logging (PG&E and NID, 2011d).

Northern bugleweed is a perennial herb native to California found in bog and fen, wetland, and riparian habitats (Calflora, 2012). One occurrence of northern bugleweed was found in the Yuba-Bear Project area in a ponded wetland adjacent to the Bowman-Spaulding transmission line. Individuals were scattered along the shoreline in moist sites, accompanied by hardstem bulrush, purple marshlocks, and buck-bean. The northern bugleweed occurrence appeared to be healthy, with plants in flower. On the western side of the area, there was evidence of dumping, possibly historic (PG&E and NID, 2011d).

Sierra starwort is a perennial herb native to California found at elevations from 4,101 to 6,463 feet msl (Calflora, 2012). Three occurrences of Sierra starwort were found in the Drum-Spaulding Project area, and seven were found in the Yuba-Bear Project area. In the Drum-Spaulding Project area, occurrences were located on Carr Lake, where dominant species included red fir, lodgepole pine, and huckleberry oak. One occurrence was located on the west bank of Fuller Lake, where dominant species included ponderosa pine, white fir, and incense cedar. All occurrences in the Drum-Spaulding Project area appeared to be healthy, with several plants flowering or in fruit. The only visible disturbances were due to logging, recreation, or road use. In the Yuba-Bear Project area, seven occurrences were found adjacent to the Bowman-Spaulding transmission line, project roads, the Bowman-Spaulding conduit, or Sawmill reservoir. Five occurrences were in mixed conifer habitats dominated by white fir, red fir, ponderosa pine, and incense cedar. One occurrence was found in an area dominated by mountain alder, lodgepole pine, and sedge. Another occurrence was found in an area dominated by dense shrub habitat, with huckleberry oak, black oak, and greenleaf manzanita. All occurrences in the Yuba-Bear Project area appeared to be healthy, with the exception of one that showed significant recent impact from road and canal maintenance. Maintenance was a visible disturbance at all but one occurrence, and a noxious weed, Klamath weed, was located in the vicinity of two occurrences (PG&E and NID, 2011d).

Water bulrush is a perennial herb native to California found at elevations below 6,900 feet msl, with a flowering period ranging from June to September. Habitats in which this species can be found include lower montane coniferous forests, meadows and seeps, and marshes and swamps. One occurrence of water bulrush was found in the Yuba-Bear Project area in a wetland area adjacent to the Bowman-Spaulling transmission line. Dominant plants in the area included hardstem bulrush, buckbean, and Cusick's sedge. About 80 percent of water bulrush individuals were blooming. There was evidence of dumping, possibly historic, on the western side of the area (PG&E and NID, 2011d).

Rocky Mountain chickweed is a perennial herb native to California found in elevations from 6,000 to 7,000 feet msl, commonly in red fir forests (Calflora, 2012). Three occurrences of Rocky Mountain chickweed were found in the Drum-Spaulling Project area, and two occurrences were found in the Yuba-Bear Project area. In the Drum-Spaulling Project area, one occurrence was located on Carr Lake, and two occurrences were located on the south side of Feeley Lake. The dominant species at Carr Lake included quaking aspen, mountain alder, alpine enchanter's nightshade, and musk monkeyflower. The dominant species at Feeley Lake included mountain alder, musk monkeyflower, and Brewer's milkwort. All occurrences in the Drum-Spaulling Project area appeared healthy, with the majority of plants in fruit or flower. In the Yuba-Bear Project area, both occurrences were located in wetlands at the end of the Milton diversion impoundment and behind Jackson Lake dam. Dominant plants in the area of the Milton diversion impoundment occurrence included yellow willow, blister sedge, and Northwest Territory sedge. Dominant plants in the area of the Jackson Lake dam occurrence included lodgepole pine, fowl mannagrass, and monkeyflower. All occurrences at the Yuba-Bear Project were healthy, with 30 percent flowering and 10 percent in fruit at the Milton diversion impoundment, and 50 percent flowering and 10 percent in fruit at Jackson Lake dam (PG&E and NID, 2011d).

Felt-leaved violet is a perennial herb native and perennial to California found in elevations from 5,000 to 6,500 feet msl, commonly in lodgepole forest, subalpine forest, and yellow pine forest habitats (Calflora, 2012). One occurrence of felt-leaved violet was found in the Drum-Spaulling Project area, and one in the Yuba-Bear Project area. In the Drum-Spaulling area, the occurrence was found along Deer Creek Road. Dominant plants in the area included ponderosa pine, incense cedar, white fir, and black oak. The occurrence at the Drum-Spaulling Project appeared healthy, with more than 80 percent of individuals in bloom. There was evidence of logging in the area. In the Yuba-Bear Project area, the occurrence was found along Bowman-Spaulling Access Road. Dominant plants in the area included pinemat manzanita and small Douglas fir. The occurrence in the Yuba-Bear Project area appeared healthy, with more than 90 percent of individuals in bloom. There was a small amount of the noxious weed, Klamath weed, along the road at the edge of the occurrence (PG&E and NID, 2011d).

Webber's ivesia is a candidate for listing under the ESA. There is no critical habitat designated for this species. Webber's ivesia is found in Great Basin scrub, lower montane coniferous forest, meadows and seeps, vernal pools, eastside meadows, and seasonal drainages at elevations between 4,805 and 7,217 feet msl (PG&E and NID, 2011d). Webber's ivesia is found generally in relatively open plant associations where competition for light and moisture with other species is low (FWS, 2012a). The range for this species includes Sierra County (FWS, 2012a). This species has a flowering period ranging from June to September (PG&E and NID, 2011d). No occurrences of Webber's ivesia were documented in the project areas, although occurrences in the vicinity of the projects (outside the project boundaries) have been documented in the Tahoe National Forest (PG&E and NID, 2011d).

PG&E and NID also conducted surveys for special interest plants, including quaking aspen and three species of mushroom, as requested by the Forest Service. Special interest plants also include elderberry, which is suitable for supporting the federally threatened VELB (section 3.3.4, *Threatened and Endangered Species*). A total of 61 occurrences of quaking aspen and 26 occurrences of elderberry were

identified in the study area (described below and in table 3-203). The mushroom species were not found within the project boundaries.

Quaking aspen is a tree native to California found in elevations from 6,000 to 10,000 feet msl, in streambank and slope habitats, and is equally likely to occur in wetlands or non-wetlands (Calflora, 2012). Thirty-eight occurrences of quaking aspen were found in the Drum-Spaulding Project area at the following locations: Drum canal; middle, upper, and lower Lindsey Lake; Culbertson Lake; Lake Spaulding; Rucker Lake; Fordyce Lake; Lake Valley canal; Lake Valley reservoir; Kelly Lake; Carr Lake; Feeley Lake; boundary between upper Feely Lake and Carr Lake; lower Lindsey trailhead; Carr-Lindsey Road; and upper Lindsey Lake Road. Twenty-three occurrences of quaking aspen were located in the Yuba-Bear Project area at the following locations: Bowman Lake; Bowman Lake campground; Jackson Meadows; Bowman-Spaulding transmission line; Milton diversion dam impoundment; Jackson Lake; Sawmill Lake; and French Lake (PG&E and NID, 2011d).

Elderberry is a large, deciduous, perennial shrub or small tree in the honeysuckle family that occurs along stream banks and forest openings below 9,840 feet msl. Habitats in which this species can be found include chaparral, foothill woodland, red fir forest, riparian forest and woodland, and yellow pine forest throughout California. A total of 26 occurrences of elderberry were located within the Drum-Spaulding Project boundary. VELB indicators (boreholes) were observed at three occurrences, all along Bear River canal. No elderberry plants were found in the Yuba-Bear Project area (PG&E and NID, 2011e).

Culturally Important Plant Species

Native American tribes use certain plant species for food, medicines, and utilitarian purposes. The 34 culturally significant plant species identified in the Drum-Spaulding and Yuba-Bear Projects are listed in table 3-204.

Table 3-204. Culturally significant plant species identified in the Drum-Spaulding and Yuba-Bear Projects.

Common Name	Scientific Name	Uses
Bitterroot	<i>Lewisia</i> sp.	food
Buckberry	<i>Shepherdia argentea</i>	food (fruit)
Bulb, Indian potato	N/A	Food
Camas	<i>Camassia</i> sp.	food, raw and cooked
Currant, desert	<i>Ribes</i> sp.	food (fruit)
Currant, golden	<i>Ribes aureum</i>	food (fruit)
Death camas	<i>Zigadenus</i> sp.	poison; ritual activities
Elderberry	<i>Sambucus glauca</i>	food (fruit)
Greasewood	<i>Sarcobatus</i> sp.	combs
Incense cedar	<i>Calocedrus decurrens</i>	bark for houses; flavoring for acorn; incense
Indian balsam, wild parsley	<i>Lomatium (Leptotaenia) dissecta</i>	medicine

Table 3-204. Culturally significant plant species identified in the Drum-Spaulding and Yuba-Bear Projects.

Common Name	Scientific Name	Uses
Indian tobacco	<i>Nicotiniana attenuata</i>	smoke; poultice; incense
Indian tobacco	<i>Nicotiniana bigelovii</i>	smoke; poultice; incense
Juniper	<i>Juniperus osteosperma/J. occidentalis</i>	flavoring for acorn; incense
Lily, sego	<i>Calochortus nuttallii</i>	food
Manzanita	<i>Arctostaphylos</i> sp.	cider; snowshoes
Miner's lettuce	<i>Claytonia perfoliata</i>	food, raw and cooked
Mormon tea	<i>Ephedra</i> sp.	medicinal tea
Mushroom	N/A	several varieties used as food
Mustard	<i>Brassica</i> sp.	seed food
Oak, black	<i>Quercus kelloggii</i>	second to pinenut in importance
Onion	<i>Allium</i> sp.	food
Pigweed	<i>Amaranthus</i> sp.	seed food
Prunus, wild plum	<i>Prunus subcordata</i>	food (fruit)
Prunus, chokecherry	<i>Prunus virginiana</i>	food (fruit)
Rhubarb	<i>Peltiphyllum peltatum</i>	food, raw and cooked
Ribes, Sierra gooseberry	<i>Ribes</i> sp.	food (fruit)
Rye, wild	N/A	seed food
Serviceberry, Saskatoon	<i>Amelanchier alnifolia</i>	food (fruit)
Strawberries	<i>Fragaria virginiana</i> and other species	food (fruit)
Sunflower	N/A	seed food
Tule	<i>Scirpus</i> sp.	food; roots boiled or roasted; shoots and seed heads raw; ripe seeds into cakes;
Watercress	<i>Rorippa curvisiliqua</i> , <i>R. sinuata</i> , <i>Barbarea vulgaris</i>	food, raw and cooked
Wild parsnip	N/A	poison; ritual activities

3.3.3.1.2 Wildlife

General Wildlife

The applicants used California Fish and Wildlife's California Habitat Wildlife Relations program and existing data from the Forest Service to determine wildlife species likely to occur in the project vicinities, based in part on vegetation community structure present in the area. The two project's

vicinities include a diversity of habitats and associated wildlife species that reflect wide variations in elevation, topography, and soils and are typical of the west slope of the Sierra Nevada in northern California. Based on a review of available data, the applicants determined that more than 380 terrestrial wildlife species have the potential to occur in the vicinity of the projects.

Nine species of amphibians occur in the vicinity of the projects and, except for two completely terrestrial species, most of these amphibians require still or slow-flowing water in which to breed. Amphibians found in the vicinity of the project areas include ensatina, California slender salamander, Sierra newt, Sierran treefrog, foothill yellow-legged frog, and American bullfrog. Sierran treefrog and foothill yellow-legged frog are further discussed in the *Special Status Wildlife Species* section, below.

Reptiles in the vicinity of the projects include western terrestrial (or mountain) garter snake, western aquatic (or Sierra) garter snake, common garter snake, western rattlesnake, western fence lizard, western sagebrush lizard, and Sierra alligator lizard. These species occur in a wide variety of habitats ranging from riverine to woodlands, forests, and grasslands. Most are active during the summer and inactive during the winter.

Common bird species that may occur in the vicinity of the projects include raptors such as red-tailed hawk and Cooper's hawk; songbirds such as dark-eyed junco and spotted towhee; woodpeckers such as white-headed woodpecker and northern flicker; and owls such as great horned owl and western screech owl. These birds are found in a variety of habitats ranging from streamside riparian habitats and wet meadows to sierra mixed conifer forests in the upper elevations of the projects (up to 5,000 feet msl) and hardwood-dominated woodlands common at the lower elevations of the projects (less than 2,000 feet msl). Some birds are only present between March and July for breeding, while others may be year-round residents.

Common mammal species in the vicinity of the projects, such as mule deer, black bear, and squirrels, are most often associated with forested and woodland habitats. Some species, such as black bear, are active during the spring and summer months and hibernate during the colder winter months. Mule deer in the vicinity of the projects are migratory and move from summer habitat at higher elevations to winter habitat along the foothills.

Black bear and mountain lion are common species throughout the Sierra Nevada, which includes both projects. Black bear and mountain lion are found in nearly all habitat types available in both projects and, like mule deer, have seasonal movements. Seasonal movement of mountain lion is likely to mimic that of mule deer, the mountain lion's primary prey. Black bear movement is most likely related to the onset of winter, causing individuals to seek out wintering dens.

Using acoustic and capture surveys, the applicants documented 15 bat species in the project areas, including big brown bat, little brown bat, California myotis, silver-haired bat, hoary bat, and Brazilian free-tailed bat; nine additional species are discussed in the *Special Status Wildlife Species* section, below. Thirteen bat roosts (two day roosts, one maternity roost, and ten night roosts) were identified in the study area. Eight Drum-Spaulding Project structures and six Yuba-Bear Project structures were found to have signs of bat use. No winter hibernacula were identified in the study area.

Special Status Wildlife Species

Special status wildlife species include species that may be protected by the state of California as endangered or threatened; California species of concern, California fully protected species, species identified as watchlist species by California Fish and Wildlife, and other species identified as special animals by California Fish and Wildlife. Also included are Forest Service Region 5 species of concern. Federally listed or proposed threatened or endangered species are discussed separately in section 3.3.4,

Threatened and Endangered Species. Candidate species and those under review by FWS for potential listing under the ESA are described below.

To identify special status wildlife species known to occur or with the potential to occur in the project areas, PG&E and NID used existing data from the Forest Service and California Fish and Wildlife to create maps that include vegetation communities, wildlife habitats, and project facilities; analyzed habitat and project O&M; and documented incidental wildlife observations. The applicants determined that 62 special status wildlife species are known or have the potential to occur in the vicinity of the Drum-Spaulding and Yuba-Bear Projects, including 5 amphibians, 3 reptiles, 35 birds, and 19 mammal species (table 3-205).

Table 3-205. Special status wildlife species known or with the potential to occur in the Drum-Spaulding and Yuba-Bear Project areas. (Source: PG&E and NID, 2011f)

Common Name	Special Status Designation ^a
Amphibians	
Foothill yellow-legged frog	FSS, SSC
Sierra Nevada yellow-legged frog	FSS, SSC
Mt. Lyell salamander	SSC
Western spadefoot	SSC, BLM-S
Sierran treefrog	MIS
Reptiles	
Western pond turtle	FSS, SSC
Northern sagebrush lizard	BLM-S
Coast horned lizard	SSC, BLM-S
Birds	
Bank swallow	CE
Greater sandhill crane	CT, CFP
American peregrine falcon	CFP
Great gray owl	CE
Willow flycatcher	CE
Golden eagle	CFP
Swainson's hawk	CT, CFP
White-tailed kite	CFP
Redhead	SSC
Barrow's goldeneye	SSC
Common loon	SSC
Bald eagle	CE
Sooty grouse	MIS

Table 3-205. Special status wildlife species known or with the potential to occur in the Drum-Spaulding and Yuba-Bear Project areas. (Source: PG&E and NID, 2011f)

Common Name	Special Status Designation^a
Mountain quail	MIS
American white pelican	SSC
Northern goshawk	SSC, BLM-S, FSS
Ferruginous hawk	BLM-S
Northern harrier	SSC
Black tern	SSC
Short-eared owl	SSC
Long-eared owl	SSC
Burrowing owl	SSC, BLM-S
California spotted owl	SSC, BLM-S, FSS, MIS
Vaux's swift	SSC
Black swift	SSC
Hairy woodpecker	MIS
Black-backed woodpecker	MIS
Olive-sided flycatcher	SSC
Loggerhead shrike	SSC
Purple martin	SSC
Yellow warbler	SSC, MIS
Yellow-breasted chat	SSC
Fox sparrow	MIS
Tricolored blackbird	SSC, BLM-S
Yellow-headed blackbird	SSC
Mammals	
Sierra Nevada red fox	CT
Yuma myotis	BLM-S
Long-eared myotis	BLM-S
Fringed myotis	BLM-S
Western small-footed myotis	BLM-S
Western red bat	FSS
Spotted bat	SSC, BLM-S
Townsend's big-eared bat	SSC, BLM-S, FSS

Table 3-205. Special status wildlife species known or with the potential to occur in the Drum-Spaulding and Yuba-Bear Project areas. (Source: PG&E and NID, 2011f)

Common Name	Special Status Designation ^a
Pallid bat	SSC, BLM-S, FSS
Western mastiff bat	SSC, BLM-S
American marten	FSS, MIS
Pacific fisher	SSC, BLM-S, FSS
Mule deer	MIS
Sierra Nevada snowshoe hare	SSC
Western white-tailed jackrabbit	SSC
Sierra Nevada mountain beaver	SSC
Northern flying squirrel	MIS
American Badger	SSC

^a Status Designations:

BLM-S = BLM sensitive species

CE = California endangered species

CFP = California fully protected species

CT = California threatened species

FSS = Forest Service sensitive species

MIS = Tahoe National Forest management indicator species

SSC = California species of special concern

The following summaries provide information about special status wildlife species that have been observed in the project study areas.

Amphibians and Reptiles

Foothill Yellow-Legged Frog—The foothill yellow-legged frog is found at elevations between 600 and 5,000 feet msl in shallow flowing streams with backwater habitats and coarse cobble-sized substrates. This species requires both mainstem and tributary habitats for long-term persistence, although small tributaries can provide seasonal habitat. Breeding occurs in spring or early summer in shallow waters. Occurrences of the foothill yellow-legged frog were reported in eight stream reaches in the Drum-Spaulding Project area (South Yuba reaches no. 3, no. 4, no. 5, and no. 6, Drum afterbay dam reach, Bear River canal diversion dam reach, Lake Valley canal diversion dam reach, and Towle canal diversion dam reach) and three stream reaches in the Yuba Bear Project area (Milton Diversion dam reach, Bowman-Spaulding diversion dam reach, and Chicago Park powerhouse reach). Additionally, although the Dutch Flat afterbay dam reach at the Yuba-Bear Project was not surveyed, previous documentation confirms foothill yellow-legged frog breeding occurrences in this location (PG&E and NID, 2010f).

Sierra Nevada Yellow-Legged Frog—The Sierra Nevada yellow-legged frog, also referred to as the Sierra Nevada DPS of the mountain yellow-legged frog, is found at elevations of about 5,900 feet msl in lakes, ponds, and streams. The species is highly aquatic in all life stages, although overland dispersal

has been documented. Due to the short growing season at high elevations, this species may require two or more years to complete the larval phase. Sierra Nevada yellow-legged frog occurrences have been documented near three reservoirs in the Drum-Spaulding Project area (Fordyce Lake, Lake Sterling, and White Rock Lake) and two reservoirs in the Yuba-Bear Project area (French Lake and Faucherie Lake). In addition, suitable habitat for the Sierra Nevada yellow-legged frog was found near one reservoir (Meadow Lake) and in one stream (upper South Yuba Bear reach no. 2) in the Drum-Spaulding Project area, and near two reservoirs (Jackson Meadows reservoir and Faucherie Lake) and in one stream (Sawmill Lake dam reach) in the Yuba-Bear Project area (PG&E and NID, 2010g).

The Sierra Nevada yellow-legged frog is a candidate for listing under the ESA. On January 16, 2003, and in subsequent notices, FWS issued a finding that the listing of the Sierra Nevada yellow-legged frog is warranted but precluded by higher priority actions to amend the lists of Lists of Endangered and Threatened Wildlife and Plants. Under a 2011 settlement agreement, FWS must either publish a listing proposal on the Sierra Nevada yellow-legged frog by end of fiscal year 2013 or make a determination that the listing is not warranted (FWS, 2012a and 2012b).

Sierran Treefrog—The Sierran treefrog, one of the most widespread and abundant amphibian species above 5,000 feet msl, is found in a variety of habitats such as grasslands, chaparral, woodlands, forests, and desert oases. This species breeds in permanently and seasonally ponded wetlands, marshes, lakes, roadside ditches, reservoirs, and slow streams. Twelve incidental sightings of Sierran treefrog were reported at the Drum-Spaulding Project (Meadow Lake, Fordyce Lake, Lake Spaulding, and Fuller Lake), and 14 incidental sightings were reported at the Yuba-Bear Project (Milton diversion impoundment) (PG&E and NID, 2011f).

Coast Horned Lizard—The coast horned lizard is found in the Sierra Nevada foothills below elevations of 4,000 feet msl. The coast horned lizard is not associated with water and is found in scrubland, grassland, coniferous woods, and broadleaf woodlands. One incidental sighting of the coast horned lizard was reported at the Drum-Spaulding Project (Bear River canal), and one incidental sighting was reported at the Yuba Bear Project (Chicago Park flume) (PG&E and NID, 2011f).

Western Pond Turtle—The western pond turtle is found at elevations up to 6,000 feet msl in a wide variety of aquatic habitats. This species tends to inhabit permanent ponds, lakes, side channels, backwaters, and pools of streams, but it is uncommon in high-gradient streams. Basking sites are important habitat elements for the western pond turtle and may include rocks, logs, banks, emergent vegetation, root masses, and tree limbs. Although it is highly aquatic, this species often overwinters in forested habitats, and in the summer, it lays eggs in shallow nests in sandy or loamy soil at upland sites as much as 1,200 feet from aquatic habitats. The western pond turtle has been documented away from aquatic habitats for as much as 7 months of the year. Use of terrestrial habitat may be in response to seasonal high flows. Thirty-two incidental observations of western pond turtle individuals were reported at five locations in the Drum Spaulding Project area (upper South Yuba reach no. 2, Kelly Lake vicinity, Deer Creek-Drum transmission line, Bear River canal diversion dam reach, and Wise forebay) and at three locations in the Yuba-Bear Project area (Dutch Flat afterbay dam reach, Chicago Park conduit, and Rollins reservoir) (PG&E and NID, 2010h).

Birds

Willow Flycatcher—The willow flycatcher is commonly found at elevations between 4,000 and 8,000 feet msl, in association with meadows where high water tables have resulted in standing water and abundant riparian shrubs. This species breeds in shrubby vegetation in meadow and riparian communities, and during the early part of the breeding season, it is found in breeding grounds with some surface water or saturated soils. The willow flycatcher is known to occur in the Yuba-Bear Project area in

the meadow complex above the Milton diversion impoundment along the Middle Yuba River (PG&E and NID, 2011g).

American Peregrine Falcon—The peregrine falcon breeds in many terrestrial biomes and occurs in greater densities in tundra and coastal areas. The most commonly occupied habitats offer protection from predators and contain steep and inaccessible cliffs for nesting with open gulfs of air and open landscapes for foraging. This species preys almost exclusively on birds captured in flight. The American peregrine falcon is a known year-long resident of the Sierra Nevada. Incidental observations of American peregrine falcon have been documented at the Drum-Spaulling Project by Lake Valley reservoir. Occurrences have been reported at the Yuba-Bear Project in the vicinity of Bowman Lake and Jackson Meadow reservoir (PG&E and NID, 2011g).

Golden Eagle—The golden eagle occurs throughout the Sierra Nevada and foothills, primarily in sparse woodlands, grasslands, savannas, lower successional forest stages, and shrubland. Cliffs, large trees, and man-made structures, such as electric transmission towers, are used for nesting. Two incidental sightings of golden eagle were reported in the Yuba-Bear Project at Jackson Meadows reservoir and near Fuller Lake (PG&E and NID, 2011g).

Bald Eagle—The bald eagle breeds or winters throughout California, except for the desert areas, and the statewide population is increasing. Most breeding in the state occurs in the northern Sierra Nevada, Cascades, and north coast range. California's breeding population is resident year-round in most areas, where the climate is relatively mild. Breeding habitat includes areas close to coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources. Most nesting territories in California are located in elevations ranging from 1,000 to 6,000 feet msl, but nesting can occur from near sea level to over 7,000 feet msl. Wintering habitat is associated with open bodies of water, primarily large lakes and reservoirs. This species preferentially roosts in conifers or other sheltered sites in winter in some areas (NID, 2008). Bald eagle occurrences have been reported at 14 locations in the Drum-Spaulling Project area (Meadow Lake, Culberson Lake, Lower Lindsey Lake, Feely Lake, Carr Lake, Blue Lake, Rucker Lake, Fuller Lake, Lake Sterling, Fordyce Lake, Lake Spaulling, Lake Valley reservoir, Kelly Lake, and Deer Creek) and at 8 locations in the Yuba-Bear Project area (Jackson Meadows reservoir, Milton reservoir, Faucherie Lake, Sawmill Lake, Dutch Flat forebay, Bowman Lake, Chicago Park powerhouse, and Rollins reservoir) (PG&E and NID, 2010i). Many of these observations were single individuals soaring or foraging. Eagles have historically nested in the project areas. One active nest is located at Lake Spaulling and another is located at Rollins reservoir.

Barrow's Goldeneye—Barrow's goldeneye is a long-distance migrant that is an uncommon winter resident of the central California coast. It is found in open water and utilizes cavities for nesting structure. Two incidental sightings of Barrow's goldeneye were documented at the Drum-Spaulling Project (PG&E and NID, 2011f).

Northern Goshawk—The northern goshawk is generally a permanent resident occurring throughout the Sierra Nevada at an elevation of about 5,500 feet msl. This species is found in forests—mainly lodgepole pine, red fir, mountain hemlock, and white pine dominated—with open understory and dense canopies, in nearby meadows or opens space, and in the vicinity of water. Nine incidental sightings of northern goshawk were documented at the Drum-Spaulling Project, 19 incidental sightings were documented at the Yuba-Bear Project, and 11 nests have been identified in the project areas (PG&E and NID, 2011f).

California Spotted Owl—The California spotted owl is a permanent resident of dense, old-growth, multi-layer mixed conifer, redwood, Douglas fir, black oak, lodgepole pine, and red fir habitat found at elevations from 1,200 to 5,500 feet msl, with a breeding season from early March through June. Eighteen

incidental sightings were documented at the Drum-Spaulding Project, 12 incidental sightings were documented at the Yuba-Bear Project, and 12 nesting sites have been identified in the project areas (PG&E and NID, 2011f).

Mammals

Sierra Nevada Red Fox—The Sierra Nevada red fox prefers red fir and lodgepole pine forests in the subalpine zone and alpine fell field of the Sierra Nevada. It uses forested areas in proximity to meadows, riparian areas, and brush fields. The Sierra Nevada population of red fox can be found in a variety of habitats that include alpine dwarf-shrub, wet meadow, subalpine conifer, lodgepole pine, red fir, aspen, montane chaparral, montane riparian, mixed conifer, and ponderosa pine. Individuals were recorded in the Drum-Spaulding Project area along the Lake Valley and South Yuba canals. However, the Tahoe National Forest recognizes the sightings of Sierra Nevada red fox may not be reliable, especially at lower elevations within its range (PG&E and NID, 2011g).

The Sierra Nevada red fox is currently under review by FWS for potential listing under the ESA. On January 1, 2012, FWS issued a 90-Day Finding on a Petition to List Sierra Nevada red fox as endangered or threatened.

Mule Deer—The mule deer is found throughout the vicinity of the projects. Mule deer are herbivorous browsers that prefer open wooded mountain and foothill areas. During the fall, mule deer migrate to lower elevations where browse is still available (California Living Museum, 2012). Three mule deer herds (Downieville, Nevada City, and Blue Canyon) and their associated seasonal habitats (winter, summer, and fawning) are known to overlap with or abut project boundaries. The Nevada City Deer Herd's range encompasses the mid-elevation of both the Drum-Spaulding and Yuba-Bear Projects. The range of the Downieville Deer Herd does not overlap with either project but abuts the Yuba-Bear Project boundary. The range of the Blue Canyon Deer Herd encompasses the southern portion of the Drum-Spaulding Project near Lake Valley. In general, summer habitat encompasses all project facilities upslope of Drum forebay and Deer Creek forebay. Winter habitat is found down slope of Drum forebay and Deer Creek forebay.

Pacific Fisher—The Pacific fisher is found throughout the Sierra Nevada. This species prefers continuous, unfragmented mature conifer forests with high canopy closure and continuous overhead cover. The Pacific fisher is carnivorous and has been known to prey on smaller mammals and birds and to consume fruit; however, the Pacific fisher will switch prey in response to availability, even preying on lizards and insects (Forest Service, 2012). Pacific fisher occurrences have been documented at the Drum-Spaulding Project (Meadow Lake, Lake Fordyce, Lake Sterling, and Lake Spaulding) and at the Yuba-Bear Project (Jackson Meadows reservoir, Milton-Bowman diversion conduit, and Sawmill Lake). Predicted habitat for the Pacific fisher exists at or is immediately adjacent to all project facilities.

The West Coast DPS of fisher is a candidate for listing under the ESA. On April 8, 2004, FWS issued a finding that the listing of the West Coast DPS of fisher is warranted but precluded by higher priority actions to amend the lists of Lists of Endangered and Threatened Wildlife and Plants. Under a 2011 settlement agreement, FWS must either publish a listing proposal on the fisher by end of fiscal year 2014 or make a determination that the listing is not warranted (FWS, 2012b and 2012c).

American Marten—The American marten can be found throughout the Sierra Nevada. The American marten prefers late-successional coniferous forests with overhead cover and complex ground structure. The presence of coarse woody debris and a closed canopy is more important than species composition for habitat selection. In the Sierra Nevada, the American marten has been observed foraging in riparian forests. Typical prey includes microtine rodents, birds, and squirrels, and this species also consumes vegetation (Kucera, 1998). American marten occurrences have been documented at the Drum-

Spaulding Project (Fordyce Lake and Lake Sterling) and at the Yuba-Bear Project (Jackson Meadows reservoir and Faucherie Lake). Predicted habitat for the American marten exists at or is immediately adjacent to all project facilities.

Northern Flying Squirrel—The northern flying squirrel is a common year-long resident of coniferous habitats commonly found at elevations between 5,000 and 8,000 feet msl. It is found in ponderosa pine, lodgepole pine, and riparian-deciduous forests. The northern flying squirrel is omnivorous and is known to eat a wide range of food from seeds, nuts, and fruits to arthropods, eggs, and small animals. Individuals live near rivers and streams, especially during the summer (California Fish and Wildlife, 2012a). Northern flying squirrel individuals are common and widespread throughout both project areas.

Special Status Bats—Nine special status species bats (Yuma myotis, long-eared myotis, fringed myotis, western small-footed myotis, spotted bat, Townsend's big-eared bat, pallid bat, mastiff bat, and western red bat) occur in Drum-Spaulding and Yuba-Bear Project facilities. These species are described below.

Yuma myotis. The Yuma myotis is found at elevations up to 10,800 feet msl; however, this species is uncommon to rare above 8,400 feet msl. The Yuma myotis roosts in buildings, mines, caves, and crevices, and feeds over water sources such as ponds, streams, and stock tanks. Prey includes moths, midges, flies, termites, ants, homopterans, and caddisflies. Yuma myotis individuals were recorded at nine locations in the Drum-Spaulding Project area (Fuller Lake dam, Lake Spaulding, Deer Creek forebay, Deer Creek powerhouse, Alta forebay, Alta powerhouse, Lake Valley diversion dam, Dutch Flat no. 1 powerhouse, and Halsey powerhouse) and four locations in the Yuba-Bear Project area (Dutch Flat afterbay, Bowman dam powerhouse, Sawmill dam, and Milton diversion impoundment) (PG&E and NID, 2010j).

Long-eared myotis. The long-eared myotis is found at elevations up to 8,400 feet msl. This species roosts in buildings, crevices, and snags, and feeds in open habitats along the edges. Insects are caught in flight, gleaned for foliage, or taken from the ground. Individuals were recorded at two locations in the Drum Spaulding Project area (Fuller Lake dam and Deer Creek forebay) and one location in the Yuba-Bear Project area (Milton diversion impoundment) (PG&E and NID, 2010j).

Fringed myotis. The fringed myotis is found at elevations between 4,300 and 7,200 feet msl. This species roosts in buildings, mines, caves, and crevices, and feeds in open habitats, over water, and by gleaning from foliage. Individuals were recorded in four locations at the Drum-Spaulding Project (Lake Spaulding, Deer Creek forebay, Deer Creek powerhouse, and Alta powerhouse) and one location at the Yuba-Bear Project (Milton diversion impoundment) (PG&E and NID, 2010j).

Western small-footed myotis. The western small-footed myotis is found at elevations up to 8,800 feet msl. This species roosts in caves, buildings, mines, and crevices and under bridges, and it feeds over the water of streams, ponds, and springs by gleaning from foliage. Individuals were recorded at one location in the Yuba-Bear Project area (Sawmill dam) (PG&E and NID, 2010j).

Spotted bat. The spotted bat is found at elevations up to 9,800 feet msl in arid deserts, grasslands, and mixed conifer forests. This species uses creeks and rivers to drink and forages in open areas and along forest edges, particularly in association with wet meadows. Individuals were recorded at two locations in the Drum-Spaulding Project area (Deer Creek forebay and Alta forebay) and at two locations in the Yuba-Bear Project area (Sawmill dam and Milton diversion impoundment) (PG&E and NID, 2010j).

Townsend's big-eared bat. Townsend's big-eared bat is found at elevations up to 10,365 feet msl. This species roosts in buildings, mines, tunnels, and caves and forages in riparian zones along habitat edges following creeks and river drainages. Townsend's big-eared bat feeds primarily on moths and comes to pools in rivers and streams to drink. Individuals were found at six locations in the Drum-Spaulding Project area (Lake Spaulding, Deer Creek forebay, Deer Creek powerhouse, Alta forebay, Lake Valley diversion, and Halsey powerhouse) and four locations in Yuba-Bear Project area (Rollins dam powerhouse, Bowman dam powerhouse, Sawmill dam, and Milton diversion impoundment) (PG&E and NID, 2010j).

Pallid bat. The pallid bat is found at elevations of about 8,000 feet msl. This species roosts in caves, crevices, and buildings, and forages in a variety of open habitats, most frequently in riparian zones in open oak savannah and open mixed deciduous forest. The pallid bat feeds primarily on ground-dwelling arthropods and comes to rivers and streams to drink. Individuals were found at two locations in the Drum-Spaulding Project area (Lake Spaulding and Deer Creek powerhouse) and one location in the Yuba-Bear Project area (Bowman dam powerhouse) (PG&E and NID, 2010j).

Western mastiff bat. The western mastiff bat is found primarily at lower elevations, but can be found at elevations as high as 8,700 feet msl. This species roosts in open areas with abundant crevices in rock outcrops and buildings. The western mastiff bat is an open-air forager and has been detected in large numbers flying and foraging over reservoirs elsewhere in its range. Individuals were found at three locations in the Drum-Spaulding Project area (Deer Creek forebay, Deer Creek powerhouse, and Alta powerhouse) and one location in the Yuba-Bear Project area (Sawmill dam) (PG&E and NID, 2010j).

Western red bat. The western red bat is found at elevations up to 9,800 feet msl in mixed conifer forests. This species roosts in foliage and forages in open areas in a number of terrestrial and aquatic habitats. Individuals were found at four locations in the Drum-Spaulding Project area (Lake Spaulding, Deer Creek powerhouse, Alta powerhouse, and Halsey powerhouse) and six locations in the Yuba-Bear Project area (Rollins dam powerhouse, Chicago Park powerhouse, Dutch Flat afterbay, Bowman dam powerhouse, Sawmill dam, and Milton diversion impoundment) (PG&E and NID, 2010j).

3.3.3.2 Environmental Effects

3.3.3.2.1 Vegetation

Drum-Spaulding Project

Vegetation Management

Vegetation management activities, such as clearing or trimming vegetation around project facilities and controlling noxious plant species could affect sensitive environmental resources.

In the final license application, PG&E proposes to develop and implement an integrated vegetation management plan to manage and mitigate for effects to vegetation (DS-TR1). PG&E would combine all measures related to the management of terrestrial vegetation into one comprehensive plan. On August 29, 2012, PG&E filed with the Commission an Integrated Vegetation Management Plan focusing on: (1) management of non-native invasive plants through prevention of the introduction, establishment, and spread, and the control and localized eradication of known infestations; (2) internal coordination of programmatic protections for VELB and VELB habitat; (3) protection of sensitive vegetation resources within the project boundary; and (4) implementation of project-related vegetation management and hazard reduction activities, according to best management practices.

Forest Service condition 34 and BLM condition 17 specify the development of a single integrated vegetation and non-native invasive species management plan for approval by the Forest Service, BLM, California Fish and Wildlife, County Agricultural Commissioner, potentially affected tribes, and other interested parties. Required minimum components of the plan would be: special status species management; sensitive area protection; non-native invasive species plant detection, management, and treatment within and beyond the project boundary; revegetation implementation and monitoring; pesticide/herbicide use approval and restrictions; and annual reporting guidelines.

California Fish and Wildlife 10(j) recommendation recommends development and implementation of an integrated vegetation and non-native invasive plant management plan similar to the Forest Service condition.

PG&E, under its alternative condition to the Forest Service and BLM conditions, would implement the Integrated Vegetation Management Plan filed with the Commission on August 29, 2012. PG&E's plan addresses the minimum components required by the agencies and the concerns expressed by the Native American communities whose tribal lands are located within the Drum-Spaulding Project boundary.

We discuss various components of vegetation management below.

Operation and Maintenance Activities

PG&E routinely clears vegetation in the immediate vicinity of project structures, including powerhouses, canals, flumes, and rock- and earth-filled dams, and along transmission line rights-of-way. Clearing is performed by mechanical means and occurs only within the area needed to maintain the structure, which constitutes a small portion of the overall project area. Activities associated with vegetation clearing do not use ground-disturbing equipment in the project and no project facilities are located on sensitive vegetation associations. The effects of the current vegetation management practices are minor and site specific. They are expected to continue for the life of the project in most project facility areas.

Our Analysis—O&M activities that currently take place as part of normal project operations have minor effects on vegetation resources within the project boundary. O&M activities and their associated effects on vegetation resources within the project boundary would continue for the term of a new license. Proposed construction activities (e.g., develop new recreation facilities and pedestrian trails) would have permanent minor to moderate adverse effects on existing vegetation.

PG&E's Integrated Vegetation Management Plan includes appropriate vegetation management measures related to O&M activities. These measures include: (1) revegetation, which is the process of reestablishing vegetation cover in disturbed areas and is a standard component of project O&M, including erosion control and site restoration; (2) routine vegetation management activities often resulting from regulatory requirements and to ensure safe and continued project operations; and (3) sensitive area protection during vegetation management to ensure that adverse effects are avoided or minimized. Additionally, the Integrated Vegetation Management Plan includes reporting guidelines with appropriate agencies and components for additional consultation that may occur, as necessary, to ensure that the goals and objectives of the Plan are being met and proposed measures are being implemented.

PG&E's plan addresses minimum components specified by Forest Service condition 34 and BLM condition 17 regarding consultation, management, protection of sensitive resources, and the plan ensures coordination for protection of project resources. Implementation of the measures outlined in PG&E's management plan would ensure that land management activities are conducted in a manner that minimizes disturbance to vegetation and provides for the revegetation of disturbed areas.

Many of these activities would occur on lands outside the National Forest. Expanding PG&E's management plan to all accessible project lands would provide additional resource protection.

Noxious Weeds

Human activities, including project O&M activities, can spread non-native invasive plants. Areas where non-native invasive plants are most likely to spread are recreation areas and roadsides, particularly at lower elevations. Recreation activities can lead to the spread of non-native invasive species, including through transport on boats, vehicles, and clothing. Project vehicles may also transport non-native invasive plant seeds from one area to another. O&M activities, such as road grading and vegetation control remove existing vegetation and can increase the spread of non-native invasive species. However, vegetation management may be beneficial, retarding the spread of some noxious weeds occurrences by removing them from around project facilities.

Forest Service condition 34 and BLM condition 17 specify that the integrated vegetation management plan prepared by PG&E include components for the management and prevention of non-native invasive plant species, such as: (1) frequency of surveys; (2) guidelines for prevention; (3) treatment; (4) internal education; (5) monitoring; (6) reporting; (7) guidelines for conducting weed risk assessment for new project feature development; (8) adaptive management element to implement methods for prevention of aquatic invasive weeds, if necessary; (9) guidelines for conducting inspections of non-native invasive plants on PG&E's equipment and vehicle; and (10) a list of target non-native invasive plants approved by BLM and the Forest Service. Additionally, the conditions specify that PG&E extend control of non-native invasive plants determined to be related to project activities up to 0.25 mile outside of the project boundary. If non-native invasive plants extend beyond 0.25 mile outside of the project boundary, the Forest Service and BLM specify that PG&E consult with the agencies regarding an appropriate course of action.

PG&E's Integrated Vegetation Management Plan addresses management of noxious weeds for the prevention, control, and eradication of noxious weeds within the project boundaries, generally consistent with the agency conditions. PG&E's management of noxious weeds focuses on prevention, monitoring, control, and adaptive management to prevent the introduction and further spread of noxious weeds, as well as eradication of noxious weed populations within the project boundary. Prevention of noxious weed introduction include: (1) cleaning of all construction equipment, earth-moving equipment, and vegetation management equipment by staff prior to entering the project boundary; (2) use of certified weed-free straw/mulch for construction, erosion control, or restoration; (3) restriction of travel to established roads and motorized trails and avoidance of travel through areas with known noxious weed populations; (4) installation and maintenance of a boat wash station at Lake Spaulding, (5) invasive species education for employees; and (6) consultation with the Forest Service and BLM prior to using non-native plant materials. Beginning in the first year following license issuance and every fifth year thereafter, PG&E would conduct a non-native invasive species monitoring within the project boundary in areas with conditions suitable for noxious weed colonization. PG&E would develop, in consultation with appropriate federal agencies, a schedule for containment or eradication of noxious weed populations that is consistent with state and federal laws. Effective control of noxious weeds would include mechanical, manual, and chemical control, in accordance with federal and state regulation, and following any required consultation with appropriate agencies. PG&E would also develop, in consultation with federal agencies, an integrated non-native invasive species treatment plan, including monitoring, in the year following the first complete non-native invasive species survey conducted after license issuance. Additionally, PG&E would target contiguous non-native invasive plants species located on federal land within and up to 100 feet outside the project boundary in areas where treatment may be conducted safely, using an integrated pest management approach. The Forest Service, BLM, and Reclamation submitted conditions for the use and restriction of collision

for the management of noxious weeds and non-native invasive plants. See section 3.3.3.2.1, *Pesticide Use*.

Our Analysis—Noxious weeds can displace native plants, reduce biodiversity, affect threatened and endangered species, alter normal ecological processes (e.g., nutrient cycling, water cycling), decrease wildlife habitat, reduce recreational value, and increase soil erosion and stream sedimentation.

The plans required by Forest Service condition 34 and BLM condition 17, and PG&E's Integrated Vegetation Management Plan, would adequately protect project lands from the project-related spread of noxious weeds and would help maintain native plant diversity and habitat quality. Forest Service condition 34 and BLM condition 17 would be more protective because they cover a larger area. Treatment of non-native invasive species up to and beyond 0.25 mile from the project boundary, as prescribed by Forest Service and BLM, however, is more distance than necessary to effectively control non-native invasive species within project boundaries, and a 100-foot buffer around the project boundary, as proposed by PG&E, is sufficient to cover project effects.

Expanding these measures to all project lands where access is available and not just federal lands would ensure more complete management of these species.

Recreation Facilities

The installation and modification of recreation facilities have the potential to affect vegetation resources including riparian and wetland vegetation, noxious weeds, and special status and special interest plants.

Forest Service condition 41 specifies that PG&E consult with the Forest Service to finalize the Recreation Facilities Plan; improve and upgrade multiple recreation facilities within the project boundary; and include specific vegetation management provisions in the plan. Areas and facilities that would be upgraded in the project area, as required by Forest Service condition 41 and the Recreation Facilities Plan, are described further in section 3.3.5.2, *Recreation Resources Environmental Effects*. In its Recreation Facilities Plan, PG&E includes provisions for avoidance, protection, mitigation, and minimization of effects to sensitive resource areas, including sensitive botanical sites, at or near planned improvement sites. PG&E would also review other pertinent management plans, including the Integrated Vegetation Management Plan, during the development of site concept and development plans to identify additional resource protection measures to be implemented during construction. PG&E's Integrated Vegetation Management Plan includes provision for vegetation management activities including revegetation, vegetation management in recreation sites, and sensitive area protections, which would aid in the protection of vegetation resources related to the upgrade of recreation facilities and routine O&M in recreation areas.

Our Analysis—Off-highway vehicle (OHV) use around reservoirs or other recreation areas not suitable for vehicle use, informal pedestrian and hiking trails, and camping in remote unauthorized or unimproved sites can result in vegetation compaction and trampling and increased erosion, and has the potential to negatively affect sensitive areas. Planned recreation improvements such as establishment of formal trails, upgrading and installation of vehicle barriers to prevent unauthorized access of OHVs, improvement of current campsites, and building authorized campsites could reduce impacts to vegetation from recreation activities.

Addition and upgrading of recreation facilities may result in clearing and compaction of vegetation, depending on the placement of the proposed changes. Maximizing the placement of changes to the existing footprint of current recreation facilities could minimize impacts to vegetation. At all sites, construction equipment and personnel have the potential to carry noxious weeds into the area. Following

guidelines for noxious weeds management on federal land and BMPs contained in the Integrated Vegetation Management Plan would reduce the potential to spread noxious weeds.

Culturally Important Species

Vegetative management could affect plant species of cultural importance to the tribes. These plants are used for food, medicines, and utilitarian purposes. Over the years, native practices have declined as a direct result of loss of culturally important plants.

Two Native American communities, the Washoe Tribe of Nevada and California and the United Auburn Indian Community of the Auburn Rancheria, expressed concern for possible project-related effects on culturally sensitive plants.

Our Analysis—It is unclear whether culturally important species are addressed in PG&E's plan. Modifying the vegetation management plan to take into consideration the cultural importance of these species would help ensure their availability to the tribes.

Pesticide Use

Pesticide use can adversely affect wildlife populations, including special status aquatic reptiles and amphibians, and can result in unintended impacts.

Forest Service condition 16 and BLM condition 37 specify restricted use of pesticides on NFS lands and BLM lands, respectively, within the project area. The conditions restrict pesticide use to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, and non-native fish on NFS or BLM lands without prior written approval of the Forest Service or BLM. PG&E would submit a request for approval of planned uses of pesticides for the upcoming year during the annual consultation meeting. The conditions specify information to be included in the request for approval of planned pesticide uses: (1) whether pesticide use is essential for use of lands; (2) locations of use; (3) application rates, doses, exposure rates, and safety risk of herbicides proposed for use; and (4) timeframes for applications. Additionally, the conditions specify restrictions regarding pesticide use near known locations of western pond turtle, Sierra Nevada yellow-legged frog, foothill yellow-legged frog, or other special status species, as well as selection of the pesticide or herbicide to be used.

California Fish and Wildlife submitted a 10(j) recommendation supporting Forest Service condition 16 restricting use of pesticides on NFS lands.

Reclamation condition b.9 specifies restricted use of pesticides on federal lands without prior written approval of Reclamation. PG&E would be required to develop and submit for approval an integrated pest management plan in advance of pesticide application for approval by Reclamation. The condition also includes restrictions on pesticide selection, application, and disposal, as well as the course of action in case of pesticide spills.

Our Analysis—Forest Service condition 16 and BLM condition 37 specify restricted use of pesticides on NFS lands and BLM lands within the project area, respectively. Additionally, PG&E's proposed Integrated Vegetation Management Plan specifies the requirement of written permission by appropriate agencies before use of pesticides for the control of non-native invasive species plants and other vegetation management activities. The measures would minimize the use of pesticides, benefiting natural resources within the project boundary, and result in a coordinated and efficient use of pesticide in instances where it is needed.

Reclamation condition b.9 specifies the restricted use of pesticides on any federal lands within the project area without prior written approval by Reclamation, and specifies the submittal of an integrated pest management plan 60 days in advance of pesticide application by PG&E. This condition is similar to Forest Service condition 16 and BLM condition 37, which specify restricted use of pesticides on NFS and BLM lands within the project area, respectively. In addition to these conditions, PG&E's proposed Integrated Vegetation Management Plan also includes requirements and restrictions for use of pesticides on all federal lands within the project areas.

Riparian and Wetland Vegetation

Riparian vegetation could be affected by changes in flow magnitude and elevation. High magnitude flows can mobilize substrate and scour riparian vegetation, while decreases in the duration of inundation during the growing season can increase riparian vegetation. Routine maintenance activities, changes in project operations, and construction activities can alter abundance and distribution of riparian vegetation and riparian communities. Additionally, non-project activities such as cattle grazing and mining activities can negatively affect riparian vegetation.

PG&E's proposes to perform channel morphology and riparian vegetation assessments in the Bear River valley, and implement flow controls to maintain bank stability in the Bear River and Drum canal, which includes the riparian and wetland areas in the Bear River reach no. 2 (DS-TR4). This measure would manage winter operation spills, focusing on: (1) limiting operation flow releases from Drum canal; (2) implementing a ramping rate for increases and decreases of flow; and (3) limiting water spilled into the Bear River from Drum canal. During facility outages lasting more than 30 days, PG&E would distribute water spilled from the Drum canal between Bear River spill, Bear Valley spill, and Tahoe spill; implement a 2-day ramping rate; and notify appropriate agencies. Additionally, PG&E would perform a quantitative and qualitative channel morphology and riparian vegetation assessment in Bear Valley meadow to determine whether project waters released into the Bear River are adversely affecting riparian vegetation and channel morphology in the Bear River valley. The applicants would consult with agencies and obtain necessary permits prior to remediation activities and then monitor the locations after remediation.

Forest Service condition 34 specifies that PG&E develop a plan to be submitted within 1 year of license issuance to assess riparian vegetation and bank stability in Bear River above Drum afterbay. The plan would include: (1) a baseline monitoring component, including a stage-discharge relationship for the Bear River stream channel at target sites; (2) a HEC-RAS model to model flow; (3) classification of the stream stratigraphy; (4) analysis of the sediment distribution and morphology; and (5) a qualitative bank stability erosion analysis. The ongoing monitoring component of the plan would include qualitative monitoring and five channel cross-sections to monitor change over time. The ongoing monitoring would occur yearly for the first 5 years and, after 5 years, every 3 years and following event-triggered flows determined by PG&E and the Forest Service.

The Forest Service also filed a 10(a) recommendation similar to PG&E's proposed measure; however, it recommends additional components to the quantitative and qualitative assessments. The Forest Service recommends installation of level-loggers to establish a stage-discharge relationship in the Bear River valley meadow; three cross-sections in the Bear River in the vicinity of the Bear valley for profiles to be taken on years 1, 5, 10, and every 5 years after year 10; and an annual qualitative assessment of three spill channels to identify sites of active erosion following spill flows.

California Fish and Wildlife filed a 10(j) recommendation similar to the Forest Service 10(a) recommendation regarding operating plan spills and outage spills at the Drum canal. In addition to recommendations included in the Forest Service 10(a) recommendation, California Fish and Wildlife also recommends an upper Bear River study to evaluate geomorphic conditions in the Bear River between

gage YB-137 and the Drum afterbay impoundment, which would also include potential measures to mitigate any project-induced erosion.

In a 10(a) recommendation, FWS recommends protecting and maintaining natural ecosystem processes. The recommendation includes several considerations for the protection of vegetation and riparian habitat, including: (1) maintaining riparian vegetation and resources in proper functioning condition and (2) maintaining or restoring streamflow regimes sufficient to sustain desired conditions of native riparian, aquatic, wetland, and meadow habitats.

PCWA approves of PG&E's proposed measure to monitor channel morphology and riparian vegetation in the Bear River valley; however, it recommends the monitoring of stream gravels to determine if they have become silted, and the monitoring of riparian vegetation, to prevent encroachment on the channel due to bank erosion.

Most of the Foothill Water Network comments are already incorporated in PG&E's proposed measure (DS-TR4); however, the Foothill Water Network suggests that PG&E establish five locations to perform cross-sections in the Lower, Middle, and Upper Meadow reaches to be surveyed with the same frequency as longitudinal profiles.

Our Analysis—Of the 11 riparian habitat and wetland areas examined by PG&E, 7 were determined to be functioning properly. The other four sites are discussed below.

The riparian habitat area in Fordyce Lake dam reach is in the process of reaching equilibrium under current O&M activities, which implemented point bars and banks to support the establishment of riparian vegetation. Since PG&E is not proposing changes to flows in the reach, the site should reach equilibrium. The wetland area in Lower Rock Lake dam reach no. 1 is expected to continue recovering since PG&E is not proposing changes to flows in the reach. Routine O&M operations would support the recovery of the wetland in the reduced presence of cattle.

The riparian habitat area and the wetland area in Bear River reach no. 2 have been affected by a variety of historical and recent uses, including grazing, local diversions, and high regulated sustained and pulse flows. Although project operational flows over the past 10 years have supported the recovery of riparian habitat, releases approaching high flows may cause or increase channel incision, bank failures, or other signs of channel instability in Bear Valley. PG&E is proposing channel morphology and riparian vegetation assessment measures in this area to determine if high flows affect conditions. The assessment would provide information to inform the development of protection and mitigation measures.

PG&E proposes to install two valves in the vicinity of the spillway gate of the Drum canal above gage YB137 in the upper reaches of the Bear River upstream of Drum afterbay to maintain minimum streamflows between 1 and 2 cfs. These low magnitude flows should not have effects on riparian vegetation. Increasing flows within reaches could lead to increased bank erosion and scouring of vegetation. Increased flows could lead to an increase in the inundation periods, which could restrict riparian vegetation growth.

PG&E's Integrated Vegetation Management Plan, filed with the Commission on August 29, 2012, contains guidance on protections for riparian vegetation and sensitive areas, including wetland and riparian areas. The guidance includes: (1) annually training staff regarding the location of riparian and wetland areas; (2) flagging of sensitive areas within a site and resource-specific buffer prior to any vegetation management activities; and (3) using BMPs in sensitive areas. This combination of approaches would protect wetland and riparian habitat during routine vegetation management activities.

Implementation of PG&E's proposed measure for the monitoring of riparian vegetation in the Bear River valley, with the additional protective measures included in the Forest Service condition 34 and Forest Service 10(a) recommendation, would provide for the assessment of effects associated with project O&M activities. The additional components contained within condition 34 and 10(a) recommendation by the Forest Service include measures for the monitoring and modeling of the in-stream and riparian features of the Bear River within the Bear River valley.

Additional monitoring suggested in California Fish and Wildlife 10(j) recommendation is repetitive of monitoring required under PG&E's proposed measures, along with Forest Service condition 34 and 10(a) recommendation.

FWS recommends a series of objectives to protect natural ecosystem processes, but provides no specific measures. Implementation of the Integrated Vegetation Management Plan, PG&E's proposed measure for monitoring of the Bear River valley, and Forest Service condition 34 and 10(a) recommendation, would meet FWS's objectives.

The Integrated Vegetation Management Plan, PG&E's proposed measure for the Bear River valley, Forest Service condition 34, and Forest Service 10(a) recommendation address comments submitted by PCWA and Foothill Water Network.

Special Status and Special Interest Plant and Fungi Species

Project-related O&M could affect special status and special interest plant and fungi species.

Forest Service condition 34 and BLM condition 14 specify that PG&E, beginning in the first full calendar year, annually review current lists of special status species that might occur in the project area and that may be affected by project O&M activities. If a species were added to the list, PG&E in consultation with Forest Service, BLM, and California Fish and Wildlife, would determine if the species or suitable habitat is likely to occur on project lands. If a special status species were likely to occur on project lands, then PG&E, in consultation with Forest Service, BLM, and California Fish and Wildlife, would develop and implement a study plan to assess the effects of O&M activities on the special status species. Additionally, if special status species were detected prior to or during construction or O&M activities, PG&E would immediately notify appropriate agencies. If it is determined that activities are adversely affecting the species, then PG&E would develop appropriate protective measures.

PG&E's Integrated Vegetation Management Plan includes a component to protect special status species through the protection of sensitive vegetation resources within the project boundary.

Forest Service conditions 12 and 34 and BLM conditions 13 and 33 are identical and specify that PG&E submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation would assess the potential effects of the proposed action on special status species or their habitats, and would include components such as: (1) avoidance or minimization of adverse effects to special status species; (2) compliance of project-related activities to protective measures in management plans for special status species; and (3) development of implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species. If necessary, Forest Service or the BLM may require mitigation techniques.

California Fish and Wildlife submitted 10(j) recommendations similar to Forest Service and BLM conditions, recommending an annual review of special status species lists and the submittal of

a biological evaluation prior to construction activities that may disturb special status species or critical habitat.

PG&E agrees with Forest Service conditions 12 and 34 and BLM conditions 13 and 33, but PG&E's alternative condition 13 to BLM would delete BLM's condition 13 to reduce redundancy with condition 33. PG&E would submit a biological evaluation for agency review prior to conducting project activities affecting special status species.

Our Analysis—Special status plants could be adversely affected by project O&M activities, including: (1) ground-disturbing activities; (2) vegetation management activities such as mechanical clearing and herbicide use; and (3) recreation use, which can lead to trampling of plants. Project O&M activities were observed directly affecting occurrences of five different special status plant species: Congdon's onion, Brandegee's clarkia, Humboldt lily, felt-leaved violet, and Sierra starwort. These activities generally affected a limited number of individual plants within a larger population occurrence. Two local populations, Brandegee's clarkia and Congdon's onion, were adversely affected in their entirety by OHV use. However, relative to the number of individuals and the area of occurrences present, the overall effect on a given species is minor.

In the Integrated Vegetation Management Plan, PG&E proposes to conduct surveys for special status plants at project facilities on federal lands within the project boundary. PG&E proposes to conduct the surveys within 1 year of license issuance and once every 10 years thereafter through the term of a new license. The surveys may include any new plant species added as result of updates to the lists of state threatened or endangered species, BLM sensitive plant species, or Forest Service sensitive and watchlist species. The surveys would be conducted according to the most currently accepted protocols. Implementation of the management plan would minimize and mitigate for any project effects to special status plant species that may occur as a result of project O&M and any new project-related construction activities.

Before construction of any project features not addressed in this EIS, PG&E would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special-status species would be developed if appropriate as part of the license amendment proceeding. Forest Service conditions 12 and 34 and BLM conditions 13 and 33 are repetitive of the license amendment process for construction activities not addressed in this EIS.

Yuba-Bear Project

Vegetation Management

Vegetation management activities, such as removal of vegetation through clearing and trimming around project activities, and control of non-native invasive plants could affect sensitive environmental resources.

In the final license application, NID proposes to implement a Non-native Invasive Plant Management Plan and a Vegetation Management Plan on Federal Land within 1 year of license issuance (YB-TR1 and YB-TR2). On August 29, 2012, NID filed an Amended Vegetation Management Plan on Federal Land and an Amended Non-Native Invasive Plant Management Plan. The Vegetation Management Plan focuses on: (1) restoration of native vegetation through re-vegetation of areas disturbed by project O&M activities; (2) conduct of necessary and required project-related vegetation management and hazard reduction activities, according to BMPs; and (3) protection of sensitive areas. The plan also includes guidelines for re-vegetation and avoidance and protection of sensitive areas. The Non-Native Invasive Plant Management Plan establishes overall management and monitoring actions to prevent the introduction of non-native invasive plants within the project boundaries,

and it includes measures to survey and monitor the distribution of non-native invasive plants, control and contain their spread, and track the success of the management activities. The plan focuses on four main components for the control of non-native invasive plants: (1) prevention, (2) monitoring/surveys, (3) non-native invasive plant treatment, and (4) reporting.

Forest Service condition 34 and BLM condition 16 specify the development and implementation of an integrated vegetation and non-native invasive species management plan as approved by the Forest Service, BLM, California Fish and Wildlife, County Agricultural Commissioner, potentially affected tribes, and other interested parties. Required minimum components of the plan would be: special status species management; sensitive area protection; non-native invasive species plant detection, management, and treatment within and beyond the project boundary; revegetation implementation and monitoring; pesticide/herbicide use approval and restrictions; and annual reporting guidelines.

California Fish and Wildlife 10(j) recommendation recommends implementation of an integrated vegetation and non-native invasive plant management plan similar to the Forest Service condition.

NID's alternative conditions to the Forest Service and the BLM conditions would implement the separate Non-Native Invasive Species Management Plan and Vegetation Management Plan filed with the Commission on August 29, 2012.

We discuss various components of vegetation management below.

Operation and Maintenance Activities

NID routinely clears vegetation in the immediate vicinity of project structures, including powerhouses, canals, flumes, and rock- and earth-filled dams, and along transmission line rights-of-way. Clearing is performed by mechanical means and occurs only within the area needed to maintain the structure, which constitutes a small portion of the overall project area. No ground-disturbing equipment for vegetation clearing is used in the Yuba-Bear Project, and no project facilities are located within sensitive vegetation associations. The effects of the current vegetation management practices are minimal and site specific.

Our Analysis—O&M activities that currently take place as part of normal project operations have minor effects on vegetation resources within the project boundary. O&M activities and their associated effects on vegetation resources within the project boundary would continue for the term of a new license. Proposed construction activities (e.g., Rollins no. 2 powerhouse, new and modified recreation facilities and pedestrian trails) would have permanent minor to moderate adverse effects on existing vegetation.

The proposed site of the Rollins no. 2 powerhouse is on land classified as barren by the CalVeg vegetation classification system, and there are non-native grasses and annuals growing at the location. Construction activities associated with construction of the powerhouse and the construction and additions of proposed recreation facilities would require removal of vegetation, grading, and increased impervious areas. Effects to vegetation would be minimized by maximizing the placement of changes within existing project footprints.

NID's Vegetation Management Plan focuses on: (1) revegetation, (2) general vegetation management, (3) sensitive areas protection, and (4) consultation and reporting. Revegetation is the process of reestablishing vegetation cover in disturbed areas and a standard component of construction, erosion control, and site restoration. The plan includes components regarding areas that may be evaluated and subject to revegetation, criteria to evaluate a site for revegetation, revegetation project planning steps,

revegetation methods, monitoring of revegetated sites, and consultation. The plan describes measures for general vegetation management of project facilities, including transmission lines, and hazard tree management, among others. The plan also includes measures for the protection and avoidance of sensitive species within the project area. Additionally, the Vegetation Management Plan includes reporting guidelines with appropriate agencies, and components for additional consultation that may occur, as necessary, to ensure that the goals and objectives of the plan are being met and proposed measures are being implemented.

NID's Vegetation Management Plan addresses minimum components specified by Forest Service condition 34 and BLM condition 16 regarding consultation, management, protection of sensitive resources, and ensure coordination for protection of project resources. Implementation of NID's Vegetation Management Plan would ensure that vegetation management activities are conducted in a coordinated effort that minimizes disturbance to vegetation and provides revegetation of disturbed areas.

Many of these activities would occur on lands outside the National Forest. Expanding NID's management plan to all accessible project lands would provide additional resource protection.

Noxious Weeds

Human activities, including project O&M activities, can spread non-native invasive plants. Areas where non-native invasive plants are most likely to spread are recreation areas and roadsides, particularly at lower elevations. Recreation activities can lead to the spread of non-native invasive plants through transport on boats, vehicles and clothing. Project vehicles may also transport non-native invasive seeds from one area to another. O&M activities, such as road grading and vegetation plant control remove existing vegetation and can increase the spread of non-native invasive plant species. However, vegetation management may be beneficial, retarding the spread of some noxious weed occurrences by removing them from Project facilities.

Forest Service condition 34 and BLM condition 16 specify the implementation of a single integrated vegetation and non-native invasive species management plan as approved by the Forest Service, BLM, California Fish and Wildlife, County Agricultural Commissioner, potentially affected tribes, and other interested parties. The conditions include minimum components of the plan for the management and prevention of non-native invasive plant species, such as, (1) frequency of surveys; (2) guidelines for prevention; (3) treatment; (4) internal education; (5) monitoring; (6) reporting; (7) guidelines for conducting weed risk assessment for new project feature development; (8) adaptive management element to implement methods for prevention of aquatic invasive weeds, if necessary; (9) guidelines for conducting inspections of NID's equipment and vehicle for non-native invasive plants; and (10) a list of target non-native invasive plants agreed to approved by BLM and Forest Service. Additionally, the conditions specify that NID extend control of non-native invasive plants determined to be related to project activities up to 0.25 mile outside of the project boundary. If non-native invasive plants extend beyond 0.25 mile outside of the project boundary, the Forest Service and BLM specify that NID would consult with the agencies regarding an appropriate course of action.

California Fish and Wildlife submitted a 10(j) recommendation to implement an integrated vegetation and non-native invasive plant management plan similar to the Forest Service condition.

In the final license application, NID proposes to implement a non-native invasive plant management plan within 1 year of license issuance (YB-TR1). On August 29, 2012, NID filed an Amended Vegetation Management Plan on Federal Land and an Amended Non-Native Invasive Plant Management Plan. NID's proposed Non-Native Invasive Plant Management Plan provides guidance for the management of non-native invasive plants on land within the project boundary. The plan establishes overall management and monitoring actions to prevent the introduction of non-native invasive

plants within the project boundaries, as well as measures to survey and monitor the distribution of non-native invasive plants, control and contain their spread, and track the success of the management activities.

NID's Non-Native Invasive Plant Management Plan provides an integrated and comprehensive approach, including a mixture of manual, mechanical, and chemical control, to manage and control non-native invasive species plants where appropriate. The plan includes restrictions and guidelines appropriate for each type of management control, as well as information regarding known populations of noxious weeds within the project boundary. The plan describes measures such as (1) employee training and prevention guidelines to prevent the further spread of non-native invasive plants and aquatic species; (2) methods to conduct monitoring surveys for known and new populations of non-native species; (3) methods for the treatment, containment, and active management of known non-native invasive plant occurrences; and (4) guidelines for consultation and reporting. NID's Non-Native Invasive Plant Management Plan focuses on prevention of non-native invasive plants, monitoring/surveying of non-native invasive plants, treatment for containment and management of non-native invasive plants, and consulting and reporting with appropriate agencies. The plan establishes several guidelines for the prevention of spread of non-native invasive plants within the project such as: (1) washing and inspecting equipment prior to entering project boundaries; (2) use of certified weed-free straw/mulch for construction and restoration activities; (3) restricting travel to established roads and motorized trails, when possible, and avoiding entering areas with existing populations of non-native invasive; and (4) restricting the use of non-native plant materials unless agreed to by the Forest Service and BLM.

NID's alternative conditions to the Forest Service and the BLM conditions would implement the Non-Native Invasive Species Management Plan and Vegetation Management Plan filed with the Commission on August 29, 2012.

Our Analysis—Noxious weeds can displace native plants, reduce biodiversity, affect threatened and endangered species, alter normal ecological processes (e.g., nutrient cycling, water cycling), decrease wildlife habitat, reduce recreational value, and increase soil erosion and stream sedimentation.

Several non-native invasive plants have been documented in the area of the proposed Rollins no. 2 powerhouse. Construction activities associated with the proposed powerhouse could lead to the spread of non-native invasive plants, as construction equipment and clothing are vectors for carrying seeds. Unwashed construction vehicles and equipment being brought in from outside areas can also bring in seeds of non-native invasive plants not present on the project area. Additionally, soil and straw used for construction, which have not been certified as weed-free, may also carry weed seeds. Following BMPs during construction would reduce opportunities for the spread of non-native invasive plants from and to the area of the proposed powerhouse.

Forest Service condition 34 and BLM condition 16 specify that NID extend control of non-native invasive plants determined to be related to project activities up to 0.25 mile outside of the project boundary. If non-native invasive plants extend beyond 0.25 mile outside of the project boundary, the Forest Service and BLM specify that NID shall consult with the agencies regarding an appropriate course of action. According to the plan, NID would target contiguous non-native invasive plants species located on federal land within and up to 100 feet outside the project boundary in areas where treatment may be conducted safely, using an integrated pest management approach. Treatment of non-native invasive species up to and beyond 0.25 mile from the project boundary is more distance than necessary to effectively control non-native invasive species within project boundaries, and a 100-foot buffer around the project boundary is sufficient to cover project effects.

The measures contained in NID's Non-Native Invasive Plant Management Plan adequately address minimum components contained in Forest Service condition 34 and BLM condition 16 for the

management of non-native invasive plants, as well as consultation with appropriate agencies. Implementation of measures outlined in NID's plan would ensure that non-native invasive plant management activities are conducted in a manner that minimizes disturbance to vegetation and sensitive resources.

Many of these activities would occur on lands outside the National Forest. Expanding NID's management plan to all accessible project lands would provide additional resource protection.

Recreation Facilities

The installation and modification of recreation facilities have the potential to affect vegetation resources including riparian and wetland vegetation, noxious weeds, and special status and special interest plants.

Forest Service condition 41 specifies that NID consult with the Forest Service to finalize the Recreation Facilities Plan; improve and upgrade multiple recreation facilities within the project boundary; and include specific vegetation management provisions in the Plan. Areas and facilities that would be upgraded in the project area, as required by Forest Service condition 41 and the Recreation Facilities Plan, are described further in section 3.3.5.2, *Recreation Resources Environmental Effects*. In its Recreation Facilities Plan, NID includes provisions for the avoidance of sensitive vegetation at or near planned improvement sites. NID would also review other pertinent management plans, including the Vegetation Management Plan, during the development of site concept and development plans to identify additional resource protection measures to be implemented during construction. NID would consult with the appropriate resource agency to ensure that recreation rehabilitation and improvements are consistent with the overall goals and specific requirements of other license conditions and other approved management plans that are protective of natural resources.

Our Analysis—OHV use around reservoirs or other recreation areas not suitable for vehicle use, informal pedestrian and hiking trails, and camping in remote unauthorized or unimproved sites can result in vegetation compaction and trampling and increased erosion, and has the potential to negatively affect sensitive areas. Planned recreation improvements such as establishment of formal trails, upgrading and installation of vehicle barriers to prevent unauthorized access of OHVs, improvement of current campsites, and building authorized campsites could reduce impacts to vegetation from recreation activities.

Addition and upgrading of recreation facilities may result in clearing and compaction of vegetation, depending on the placement of the proposed changes. Maximizing the placement of changes to the existing footprint of current recreation facilities could minimize impacts to vegetation. At all sites, construction equipment and personnel have the potential to carry noxious weeds into the area. Following guidelines for noxious weeds management on federal land and BMPs contained in the vegetation management plan will reduce the potential to spread noxious weeds.

One recreation facility with proposed changes, Bowman Lake, has known non-native invasive plant occurrences (Klamath weed) in the area, so the overall effect of the proposed recreation changes is likely to be minor, if any, for spreading seed from already present occurrences of plants. However, at all sites, construction equipment and personnel have the potential to carry non-native invasive plant seeds into the area.

Culturally Important Species

Vegetative management could affect plant species of cultural importance to the tribes. These plants are used for food, medicines, and utilitarian purposes. Over the years, native practices have declined as a direct result of loss of culturally important plants.

Two Native American communities, the Washoe Tribe of Nevada and California and the United Auburn Indian Community of the Auburn Rancheria, expressed concern for possible project-related effects on culturally sensitive plants.

Our Analysis—It is unclear whether culturally important species are addressed in NID's plan. Modifying the vegetation management plan to take into consideration the cultural importance of these species would help ensure their availability to the tribes.

Pesticide Use

Pesticide use can adversely affect wildlife populations, including special status aquatic reptiles and amphibians, and can result in unintended impacts.

NID proposes to restrict use of pesticides, including herbicides, on Forest Service land, land administered by BLM, or areas affecting Forest Service land to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash, fish, etc., without the prior approval of the Forest Service or BLM, as appropriate (YB-GEN7).

Forest Service condition 16 and BLM condition 56 specify restricted use of pesticides on NFS lands and BLM lands, respectively, within the project area. The conditions restrict pesticide use to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, and non-native fish on NFS or BLM lands without prior written approval of the Forest Service or BLM. NID would be required to submit a request for approval of planned uses of pesticides for the upcoming year during the annual consultation meeting. The conditions specify information to be included in the request for approval of planned pesticide uses: (1) whether pesticide use is essential for use of lands; (2) locations of use; (3) application rates, doses, exposure rates, and safety risk of herbicides proposed for use; and (4) timeframes for applications. Additionally, the condition contains restrictions regarding pesticide use near known locations of western pond turtle, Sierra Nevada yellow-legged frog, foothill yellow-legged frog, or other special status species, as well as selection of pesticide or herbicide to be used.

California Fish and Wildlife submitted a 10(j) recommendation supporting Forest Service condition 16 restricting use of pesticides on NFS and BLM lands.

The Foothill Water Network submitted comments supporting NID's proposed measure for the use and restrictions of pesticides on federal land.

Our Analysis—NID's proposal to restrict use of pesticides on Forest Service or BLM controlled lands complies with Forest Service condition 16 and BLM condition 56 pertaining to pesticide use on lands managed by federal agencies and would protect natural resources, including vegetation, within the project boundary. The measure would minimize the use of pesticides benefiting natural resources within the project boundary, and result in a coordinated and efficient use of pesticide in instances where it is needed.

Riparian and Wetland Vegetation

Riparian vegetation could be affected by changes in flow magnitude and elevation. High magnitude flows can mobilize substrate and scour riparian vegetation, while decreases in the duration of inundation during the growing season can increase riparian vegetation. Routine maintenance activities, changes in project operations, and construction activities can alter abundance and distribution of riparian vegetation and riparian communities. Additionally, non-project activities such as cattle grazing and mining activities can negatively affect riparian vegetation.

In a 10(a) recommendation, FWS recommends protecting and maintaining natural ecosystem processes. The recommendation includes several considerations for the protection of vegetation and riparian habitat, including: (1) maintaining riparian vegetation and resources in proper functioning condition and (2) maintaining or restoring streamflow regimes sufficient to sustain desired conditions of native riparian, aquatic, wetland, and meadow habitats.

NID's Vegetation Management Plan contains measures for the protection of sensitive resources, including riparian and wetland areas.

Our Analysis—Six of the seven riparian and wetland habitat sites examined within the project were found to be functioning properly. The proposed project would have a minimal effect on the six functioning sites under normal O&M activities.

The seventh site, a riparian site in the lower Bear River downstream of the Dutch Flat afterbay dam, is in a section of stream that has been highly disturbed by historic gold mining operations. NID concluded that non-project activities have contributed to the current condition and the site is currently recovering. Recovery in this area is slow near the Dutch Flat afterbay dam, as intermittent high flows have scoured establishing vegetation. These flows are related to high water years, when there is more water in the Bear River than the Dutch Flat afterbay has the capacity to hold, and is not related to project-related releases but instead is related to overtopping of the dam. The proposed project would have a minimal effect on the riparian habitat downstream of Dutch Flat afterbay.

Construction of the proposed recreation facility at the Dutch Flat afterbay may require removal of an unknown amount of riparian vegetation along the shorelines.

NID's Vegetation Management Plan provides management guidance for vegetation within the project boundary, including riparian vegetation and wetland areas. NID's proposed measures for the protection of sensitive resources include: (1) annual employee training of staff regarding location of riparian and wetland areas; (2) flagging of sensitive areas within a site and resource specific buffer prior to any vegetation management activities; and (3) using best management practices in sensitive areas. These measures would be appropriate for the protection of wetland and riparian habitat during routine vegetation management activities.

FWS recommends a series of objectives to protect natural ecosystem processes but provides no specific measures. Implementation of the Integrated Vegetation Management Plan would meet FWS's objectives.

Special Status and Special Interest Plant and Fungi Species

Project-related O&M could affect special-status and special interest plant and fungi species.

NID's proposes to review special status species lists annually and assess whether new species are likely to occur on federal lands, in consultation with the Forest Service and BLM

(YB-GEN3). NID would review any species on the Forest Service sensitive species list, the Tahoe National Forest watch list, or the BLM list that might occur on any land within the project area and that may be affected by project operations. If a species were listed, NID would determine if the species or suitable habitat is likely to occur on project land. NID would then coordinate with the appropriate agencies to assess and minimize the effects of project activities on the species.

BLM condition 21 is identical to NID's proposal to review special status lists annually (YB-GEN3). Forest Service condition 34 is similar to NID's proposal (YB-GEN3); however, it includes additional details regarding notification and distribution of reports resulting from the annual review.

NID's proposes to consult with appropriate federal agencies prior to construction activities on federal land (YB-GEN5). NID would submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation would assess the potential effects of the proposed action on special status species or their habitats, and would include components such as: (1) avoidance or minimization of adverse effects to special status species; (2) compliance of project-related activities to protective measures in management plans for special status species; and (3) development of implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species. If necessary, Forest Service or the BLM may require mitigation techniques.

Forest Service conditions 12 and 34 and BLM conditions 20 and 52 are identical to NID's proposed measure regarding consultation prior to building of new facilities on federal land, and specify that NID submit a biological evaluation prior to construction activities that may disturb special status species or critical habitat (YB-GEN5).

California Fish and Wildlife submitted 10(j) recommendations similar to the Forest Service conditions recommending an annual review of special status species lists and the submittal of a biological evaluation prior to construction activities that may disturb special status species or critical habitat.

The Foothill Water Network submitted a comment supporting the Forest Service condition 34 regarding the annual review of special status species lists.

Our Analysis—Special status plants could be adversely affected by the following project O&M activities: (1) ground-disturbing activities; (2) vegetation management activities such as mechanical clearing and herbicide use; and (3) recreational use, which can lead to trampling of plants. Project O&M activities were observed directly affecting occurrences of four different special status plant species: Congdon's onion, Brandegee's clarkia, round-leaved sundew, and Sierra starwort. These effects generally affected a limited number of individuals within a larger occurrence. In all cases, the effects were site-specific, though the duration could be long term, if project operations continue unchanged. However, relative to the number of individuals and the area of occurrences present, the overall effect on a given species is minor.

No occurrences of special status plants were observed growing on or directly adjacent to the site of the proposed Rollins powerhouse no. 2. In addition, the habitat is not suited to the special status plants with the potential to grow in the project area.

The proposed changes or additions to recreation facilities are not located on or near known special status plant occurrences. The closest occurrences of special status plants are on the opposite bank of the reservoirs at both Milton diversion dam impoundment and Dutch Flat afterbay. The proposed recreation facilities should not affect special status plants.

NID's proposal to review annually special status species and their potential to be present within the habitats contained within the project boundary addresses the measures specified in Forest Service condition 34 and BLM condition 21, and would be protective of special status plants present within the project. In the Vegetation Management Plan, NID proposes to conduct surveys on federal lands for special status plants at project facilities within the project boundary. NID proposes to conduct the studies within 1 year of license issuance and once every 10 years thereafter through the term of a new license. The surveys may include any new plant species added as result of updates to the lists of state threatened or endangered species, BLM sensitive plant species, or Forest Service sensitive and watchlist species. The surveys would be conducted according to the most currently accepted protocols.

Before construction of any project features not addressed in this EIS, NID would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special-status species would be developed if appropriate as part of the license amendment proceeding. NID's proposal to consult with federal agencies prior to construction activities on federal land, Forest Service conditions 12 and 34, and BLM conditions 20 and 52 are repetitive of the license amendment process for construction activities not addressed in this EIS.

NID's restricted use of pesticides and herbicides (YB-GEN7), and implementation of the Vegetation Management Plan (YB-TR2) and the Non-Native Invasive Plant Management Plan (YB-TR1) would also minimize effects to special status plants located within the project boundary.

3.3.3.2.2 Wildlife

Drum-SpaULDing Project

Wildlife (General)

Terrestrial wildlife species within the project boundary have become accustomed to the O&M activities associated with the Drum-SpaULDing Project. PG&E has not proposed new activities (i.e., new construction) within the new license application that would be expected to affect terrestrial wildlife adversely, when compared to the existing conditions. Mobile wildlife species intolerant of disturbance would be expected to flee during periods of project O&M and return when the activities have ceased. The effects of PG&E activities would generally be temporary and not severe enough to negatively affect the survival of a species or population.

Project effects on wildlife, agency conditions and recommendations related to wildlife, and PG&E's proposed wildlife measures are discussed below for various wildlife resources.

Special Status Wildlife Species

General

The project could affect special status wildlife species as a result of maintenance activities and recreational use. PG&E proposes to consult annually with the Forest Service, BLM, and Reclamation (DS-GEN1) and perform annual employee training for staff associated with project O&M activities (DS-GEN2), which would ensure that effects on special status wildlife species would be minor. Annual Consultation would (1) allow PG&E's planned activities to be efficiently coordinated to the extent possible with Forest Service, BLM, and Reclamation activities; (2) make the Forest Service, BLM, and Reclamation aware of PG&E's planned O&M activities on federal land; and (3) make PG&E aware of all pertinent Forest Service, BLM, and Reclamation orders, rules, and policies that might affect planned activities. PG&E would meet with the Forest Service, BLM, Reclamation, and other agencies annually to discuss PG&E's planned project O&M activities for that calendar year. Annual employee training would

train operations staff annually to familiarize them with special status species and sensitive areas within the project boundary. PG&E would direct staff to avoid disturbance to special status species.

PG&E's proposed measures to annually consult with appropriate agencies and perform annual employee training are consistent with Forest Service condition 1 for annual consultation and condition 28 for annual employee training; BLM condition 1 for annual employee training and condition 23 for annual consultation; and California Fish and Wildlife 10(j) recommendation 1 for annual employee training and 10(j) recommendation 1 for annual consultation.

In the Integrated Vegetation Management Plan, PG&E establishes protection measures for vegetation management activities with the potential to affect directly special status wildlife by way of habitat modification, and disturbance through mechanical noise. A limit of operating period would be applied to activities that involve use of heavy equipment, loud noises, or habitat alteration to protect special status wildlife.

Forest Service conditions 34 and BLM condition 14, specify PG&E to review annually the current lists of special status species that might occur in the project area and that may be affected by project O&M activities. The conditions include provisions for consultation and procedures if a special status species is detected on project land and appropriate measures to follow.

Forest Service conditions 12 and 34 and BLM conditions 13 and 33, specify PG&E to submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation includes provisions to evaluate the potential effects of a proposed action on special status species or its habitat, and components to ensure protection of special status species. PG&E agrees with the Forest Service conditions 12 and 34 and BLM conditions 13 and 33. PG&E would submit a biological evaluation for agency review prior to conducting project activities affecting special status species.

PG&E's alternative condition 13 to BLM's conditions accepts BLM condition 33 and the deletion of condition 13 to reduce redundancy.

Our Analysis—Project activities that can potentially affect special status species include: (1) vegetation management activities such as removal of hazard trees, non-native invasive plant control, defensible space maintenance, and clearing of transmission line rights-of-way; (2) recreation activities such as OHV use, camping, and hiking; and (3) facility maintenance activities such as inspections, road grading, annual repairs, and emergency repairs. Due to the abundance and widespread occupancy of the project area, there is no evidence to suggest that project activities adversely affect special status wildlife species.

PG&E's proposal to annually consult with appropriate federal agencies, annually train staff regarding the location of special status species occurrences, and use BMPs in sensitive areas would provide protection to special status species within the project boundary. In addition, annual review of special status species as specified in Forest Service condition 34 and BLM condition 14 would provide a mechanism for the evaluation of effects of project operation and maintenance on newly listed species and development of appropriate protective measures.

Before construction of any project features not addressed in this EIS, PG&E would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special-status species would be developed if appropriate as part of the license amendment proceeding. Forest Service conditions 12 and 34 and BLM conditions 13 and 33 are repetitive of the license amendment process for construction activities not addressed in this EIS.

Amphibians and Reptiles

Project O&M could potentially affect the foothill yellow-legged frog, coast horned lizard, and western pond turtle.

Forest Service condition 35 specifies that an aquatic species monitoring program be developed and reports of monitoring efforts be filed with the Commission annually. The condition specifies monitoring for the foothill yellow-legged frog and western pond turtle and includes provisions regarding: (1) reaches to monitor; (2) number of sites and frequency of monitoring; (3) distribution and population metrics; (4) habitat and environmental conditions to monitor; and (5) reporting of the monitoring program.

California Fish and Wildlife submitted a 10(j) recommendation similar to Forest Service condition 35 suggesting the development of a monitoring plan for aquatic species.

PG&E's alternative condition to Forest Service condition 35 includes foothill yellow-legged frog as a target species in the Aquatic Monitoring Plan submitted August 29, 2012. PG&E would monitor foothill yellow-legged frog with methods similar to those used during the relicensing surveys. Foothill yellow-legged frog monitoring would be conducted in stream reaches where breeding populations of the frog have been documented and where data are needed to assess response to flow-related changes in habitat conditions under the new license. Where possible, PG&E would sample at the same locations as relicensing surveys to allow for comparison to conditions under the existing license (PG&E and NID 2010a, 2011g). The reaches offered by PG&E are affected by the Spaulding No. 1 and No. 2 Development and include: (1) one site on South Yuba River between Spaulding dam and Fall Creek; and (2) two sites on South Yuba River between Fall Creek and Canyon Creek.

Monitoring would be performed during the first 2 full years following license issuance; in years 5 and 6, 9 and 10; and then annual surveys at 6-year intervals. PG&E states that the intervals between survey periods should be sufficient to document recruitment into the adult population and to characterize population response to flow conditions under the new license. Water temperature, a critical factor in balancing streamflow measures for protection and enhancement of both resident rainbow trout and populations of foothill yellow-legged frog, would be monitored by PG&E at key locations and throughout the seasons that the sites can be safely accessed.

Additionally, according to PG&E's Integrated Vegetation Management Plan, any pesticide application that is deemed necessary on federal land within 500 feet of known populations of California red-legged frog, Sierra Nevada yellow-legged frog, or foothill yellow-legged frog would be designed to avoid adverse effects to individuals and their habitats.

PG&E proposes to record incidental observations of western pond turtle as part of any aquatic monitoring activity. PG&E's relicensing study results for western pond turtle, including accumulated incidental observations, known records, and the results of surveys on Canyon Creek and the Middle Yuba River, provide no evidence that western pond turtle occurs in project-affected stream reaches (PG&E and NID 2010c, 2010k). PG&E provides the following rationale for making incidental observations rather than a more quantitative survey. Western pond turtle is an amphibious species that spends a large part of the year and critical life stages, including nesting (i.e., egg laying), in terrestrial habitat that would be unaffected by streamflow changes. Terrestrial-dependent nest success and hatchling survivorship are believed to be the critical life stages for western pond turtle population growth and success. Practical methods to monitor the western pond turtle hatchling/juvenile stage have not been developed by researchers, except in unusual circumstances where nesting areas are known.

FWS also filed a 10(a) recommendation that PG&E develop a bullfrog eradication plan for all project lakes, reservoirs, and impoundment areas.

Our Analysis—Proposed changes in minimum stream flows and associated changes in water temperature and spill cessation measures have the potential to affect aquatic habitat of the yellow-legged frog and western pond turtle. Overall it is expected that these measures would improve habitat and provide greater protection for these species; however, while proposed spill cessation measures would reduce stranding and enhance survival of early life stages of foothill yellow-legged frog, concern has been expressed that cooler water temperatures maintained by higher flows could adversely affect foothill yellow-legged frog in some reaches.

Evidence of foothill yellow-legged frog breeding sites was found in the South Yuba River below Lake Spaulding dam. Habitat and flow analysis determined that under existing operation the percent of WUA for foothill yellow-legged frog eggs is above the targeted 80 percent for extreme critically dry water years, critically dry water years, and dry water years, but below 80 percent for below normal water years, above normal water years, and wet water years. Percent WUA for foothill yellow-legged frog tadpoles was above 80 percent for all water years. Effects of proposed minimum flows on frog habitat are discussed in section 3.3.2.2.2, *Aquatic Resources, Instream Flows* and section 3.3.2.2.7, *Aquatic Resources, Water Quality*.

In the North Fork of the North Fork American River below Lake Valley canal diversion dam, the foothill yellow-legged frog was detected at low numbers and evidence of breeding sites was found. Percent of WUA under existing operation for foothill yellow-legged frog eggs was above 80 percent for all water years except critically dry and extreme critically dry water years. Percent WUA for foothill yellow-legged frog tadpoles was above 80 percent for below normal, above normal, and wet water years, but below 80 percent for extreme critically dry, critically dry, and dry water years. Effects of proposed minimum flows on frog habitat are discussed in section 3.3.2.2.2, *Aquatic Resources, Instream Flows*.

In Canyon Creek below Towle canal diversion dam, there were two foothill yellow-legged frog detections, but evidence of breeding was not found. Percent WUA under existing operation for foothill yellow-legged frog eggs and tadpoles was above 80 percent for all water years. Effects of proposed minimum flows on frog habitat are discussed in section 3.3.2.2.2, *Aquatic Resources, Instream Flows*.

In the Bear River below Drum afterbay, few adults and juveniles were detected, but there was no evidence of breeding sites. A flow-habitat analysis was not developed for this reach.

No surveys for foothill yellow-legged frog were performed in the South Fork Deer Creek below Deer Creek powerhouse due to the short length of the reach (less than 0.1 mile).

The following reaches are above foothill yellow-legged frog elevation range and are not expected to affect foothill yellow-legged frog populations: South Yuba River below Kidd Lake dam and Lower Peak Lake dam; Fordyce Creek below Fordyce Lake dam; and North Fork of the North Fork American River below Lake Valley reservoir dam. No foothill yellow-legged frogs were detected in the Bear River below the Highway 20 crossing.

In other reaches, due to the small amount of operational control, foothill yellow-legged frog habitat is expected to be relatively unaffected by the proposed flows.

PG&E and NID conducted a study to map potentially suitable western pond turtle aquatic habitat and nesting habitat, assembled information associated with incidental observations reported during

relicensing studies from 2007 to 2009, and evaluated 41 sites within both projects on canals in areas below 6,000 feet of elevation associated with reservoirs, afterbays, forebays, canals, and stream reaches potentially affected by the projects. Project reservoirs, forebays, and afterbays lack suitable habitat to support western pond turtle populations, particularly adequate basking substrates and the vegetated, shallow water areas that are necessary for juvenile western pond turtle.

Aquatic monitoring during implementation of new license conditions would provide information necessary to assess the effects of flow modifications on special status species.

Measurement of appropriate critical habitat conditions would be an important component of a monitoring program to evaluate the effects of flow-related habitat changes on special status species, foothill yellow-legged frog in particular.

Forest Service condition 35 for a monitoring program includes the following target species: foothill yellow-legged frog, western pond turtle, rainbow trout and other native fish species of interest, aquatic benthic macroinvertebrates, and aquatic invasive species. PG&E's Aquatic Monitoring plan proposes monitoring for stream fish, foothill yellow-legged frog, and incidental observations of the western pond turtle and aquatic invasive species. Monitoring for stream fishes in the Aquatic Monitoring Plan is discussed in section 3.3.2.2.8 *Aquatic Biota*.

The Forest Service's monitoring program condition specifies that PG&E conduct annual monitoring within the first 10 years of license issuance, and after 10 years, PG&E would consult with agencies to determine if annual monitoring should continue. In its Aquatic Monitoring Program, PG&E proposes to monitor annually within the first 2 years after license issuance and in years 5, 6, 9, and 10; after this, PG&E would monitor at 6-year intervals.

The Forest Service specifies that monitoring for the foothill yellow-legged frog and western pond turtle should occur at one to four survey sites in most large reaches within the project. PG&E's plan would require monitoring foothill yellow-legged frog in reaches where breeding populations of the frog have been documented and where data are needed to assess response to flow-related changes in habitat conditions under the new license. PG&E proposes to monitor three sites in two reaches with evidence of foothill yellow-legged frog breeding. PG&E would only note incidental observations of western pond turtle.

PG&E's Aquatic Monitoring Plan provides a focused monitoring program for foothill yellow-legged frog in project-affected reaches with documented populations of the species that could be influenced by flow modifications proposed for the new license. Given the strong relationship of flow and water temperature in some of these reaches and the concern for balancing habitat conditions for resident rainbow trout and foothill yellow-legged frog, continuous water temperature monitoring proposed in selected reaches should provide valuable information, in conjunction with biota surveys, to assess potential project flow-related effects.

Project flows are not likely to affect western pond turtle populations given their dependence on terrestrial habitat for the success of critical life stages.

Although western pond turtle may occur in some project-affected reaches, a focused monitoring program is not likely to generate useful data to evaluate western pond turtle population response to flow-related changes. Aside from documenting occurrence, the project-wide monitoring plan specified by the Forest Service and recommended by California Fish and Wildlife would not generate data useful for evaluating project effects or informing decisions for protection or enhancement of the species. Recording of incidental observation of western pond turtle during other monitoring surveys would be adequate for documenting locations of occurrence; if incidental observations indicate the need for focused surveys of

site-specific conditions, studies could be developed through the annual consultation process and the license can be reopened if necessary.

Reservoir elevations would only be slightly affected under the proposed project; thus, no additional effects to amphibians or reptiles using the reservoirs are expected.

Bullfrogs are non-native species that prey on yellow-legged frogs and other native frog species. Eradication of predators can be an effective means of conserving special status frog species. However, bullfrogs were introduced into California more than 100 years ago and are well established in lowland and foothills in California. They utilize stock and irrigation ponds, irrigation ditches, low gradients streams, impoundments, and other warmwater habitat; many of these habitats are situated on private property, which is outside the jurisdiction of the Commission. Although bullfrog eradication could be successful in small ponds that can be drained, more widescale efforts have not been widely implemented. Additionally, bullfrogs are capable of dispersing long distances over land and within stream systems. Thus, the recommendation for the development of a bullfrog eradication plan that addresses the project is impracticable.

Road maintenance activities such as grading have the potential to affect the coast horned lizard; however, there is no information indicating that project facilities currently adversely affect coast horned lizard. Because PG&E proposes no changes to the project that would reasonably affect coast horned lizard, the proposed project is not expected to have an effect on coast horned lizard.

Project operations may result in decreased reservoir levels earlier in the year, which could have a potentially negative effect on breeding habitat for the Sierran treefrog and Sierra Nevada yellow-legged frog. Project operation affecting reservoir levels could also have a negative effect on Sierra Nevada yellow-legged frog that commonly used marshy edges of reservoirs.

Birds

Normal project O&M activities and increased recreational use could potentially disturb special status bird species, such as the bald and golden eagle, northern goshawk, California spotted owl, and Barrow's goldeneye. Avian impacts associated with project transmission lines can occur through electrocution or injury from collisions.

In the final license application, PG&E proposes to implement a bald eagle management plan as approved by the Commission (DS-TR5). On June 18, 2012, PG&E submitted a Bald Eagle Management Plan to the Commission. The plan contains measures to ensure that project O&M activities, as well as project-related recreation activities, do not disturb nesting birds by implementing mitigation measures consistent with federal and state guidelines, performing bald eagle nest surveys in selected project areas, and establish a buffer zone around each nest.

PG&E's Bald Eagle Management Plan is intended to provide guidance for the protection of bald eagles nesting within the project boundary that may be affected by project activities. PG&E would survey lands in selected project areas in the beginning of the first full calendar year after license issuance for bald eagle nests and every 5 years thereafter. The surveys would determine and confirm occupancy of territories, presence of eggs or nestlings, and determine nest success. Nest buffers of a 1,000-foot radius would be established around documented nests, and limits of operating periods would be established for project-related activities within the buffer areas. Non-routine O&M activities such as weed abatement, road maintenance, and construction would not occur within the buffer while the limited operation period is in effect. PG&E would consult annually with appropriate agencies to review results of nesting surveys and make agencies aware of planned activities that may disturb nesting bald eagles.

PG&E's Bald Eagle Management Plan is in accordance with Forest Service condition 34 and BLM condition 16, and the plan is consistent with current National Bald Eagle Management Guidelines.

In the Integrated Vegetation Management Plan, PG&E outlines limit of operation periods for the California spotted owl (March 1 to August 15), the northern goshawk (February 15 to September 15), and the great gray owl (March 1 to August 15) to avoid sensitive breeding periods.

Forest Service condition 34 and BLM condition 16 specify that PG&E implement a bald eagle management plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and California Water Board.

California Fish and Wildlife submitted a 10(j) recommendation identical to Forest Service condition 34 regarding a bald eagle management plan.

Forest Service condition 34 and BLM condition 15 specify that PG&E record annually all incidental observations of bird collisions and electrocutions along the Bowman-Spaulding transmission line. Observations would include date and location, species and number of birds, bird condition (i.e., dead or injured), band number, if available, and suspected cause of death. The conditions also specify the use of raptor-safe powerline design as described in APLIC's "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006," or the most current edition of this document, for new power lines or when replacing existing structures such as poles, phase conductors, and associated equipment on project lands. If raptor collision monitoring indicates a substantial issue with raptor-project transmission line interactions, the poles where the interaction issue occurs would be replaced or retrofitted, as agreed with the Forest Service, FWS, and California Fish and Wildlife.

California Fish and Wildlife filed a 10(j) recommendation recommending the recording of incidental observations and use of the APLIC's suggested practices for new poles or when retrofitting existing poles. It also recommends that PG&E conduct an evaluation of project power poles within 1 year of license issuance and replace or retrofit any poles that are inconsistent with APLIC's suggested practices.

PG&E's alternative to Forest Service condition 34 and BLM condition 15 proposes that APLIC's suggested practices be used only as a guideline.

Our Analysis—Occasional visiting golden eagles may be disturbed by recreation activities; vegetation clearing during maintenance of fire breaks along roadsides, canals, transmission lines, and recreation facilities; or routine, intermittent facilities maintenance. These activities may lead to flushing of perched birds. However, given the infrequency of golden eagle visits to the project area, the localized nature of potential disturbances, and the intermittent duration of these activities, the project would have a minor effect on golden eagles.

Barrow's goldeneye is highly unlikely to overlap with project O&M activities due to their infrequent presence in the project area. PG&E is unaware of any information indicating that project facilities adversely affect Barrow's goldeneye.

Northern goshawk and California spotted owl are known to be sensitive to disturbances while nesting. Disturbances while nesting may result in nest abandonment, which could lead to nest failure. Project activities in the vicinity of the protected activity centers and their associated nests that may disturb nesting birds include vegetation management activities such as removal of hazard trees; non-native invasive plant control, defensible space maintenance, and clearing of transmission line rights-of-way; recreation activities such as OHV use, camping, and hiking; and facility maintenance activities such as inspections, road grading, annual repairs, and emergency repairs. Most of these activities are ongoing,

routine, and limited in duration and area, and it is probable that the northern goshawk and California spotted owl have become acclimated to these activities. Removal of hazard trees, emergency repairs and some recreation activities are neither ongoing nor routine and may occur in protected activity centers. These activities are most likely to affect breeding activities if they occur during the breeding period. Limiting vegetation management activities during sensitive periods for these species would minimize potential disturbance.

The proposed project would result in an increase in recreationists and their activities that have the potential to disturb nesting bald eagles. The degree to which bald eagles may be disturbed is dependent on the type and location of activities relative to active nests. Activities such as camping and swimming are least likely to disturb nesting bald eagles because they are generally restricted to specific areas and result in a minimal increase in noise. Activities involving the use of motorized transportation such as boats and OHVs are most likely to disturb nesting bald eagles. Use of motorized boats results in increased noise and allows access to nearly all of a water body. Although OHV use is restricted to land, it may allow recreationists to access areas near nesting trees. Other activities such as hiking/walking and non-motorized flat-water boating are relatively noninvasive with respect to an increase in noise, but they also lead to an increase in human presence in and around project reservoirs where bald eagles may nest. The proposed project does not include any construction activities, timber harvest, or blasting and other loud intermittent noises. The proposed project and the associated increase in recreation use would have a minor effect on bald eagles.

Implementation of PG&E's Bald Eagle Management Plan, including nest buffers and limited operating periods, would identify and protect active eagle nests from disturbance and is sufficient for the protection of nesting bald eagles within the project boundary.

Monitoring bald eagle nests would be useful in detecting changes in use and determining the need for protective measures. Monitoring would be increasingly important as bald eagle populations in California continue to grow and expand their range.

No raptor collisions or electrocutions have been reported at either the Drum-Spaulling Project switchyards or transmission lines (PG&E, 2011a). PG&E has developed a generic avian protection program for Drum-Spaulling Project facilities, as part of its system-wide avian protection program, to reduce the potential for detrimental effects of avian interaction with power lines.

The recording of incidental observations of bird collisions and electrocutions at the Bowman-Spaulling transmission line and the retrofit of problem lines and design of new poles or lines consistent with APLIC's "Suggested Practices for Avian Protection on Power Lines" as specified by Forest Service condition 34 and BLM condition 15, would protect avian resources that habitually use powerlines and other energized equipment within the project boundary.

California Department of Fish and Wildlife recommends that PG&E conduct an evaluation of project transmission lines and replace or retrofit all power poles inconsistent with APLIC guidelines regardless of whether any mortalities have been associated with those poles. Transmission lines less than 69 kV can be an electrocution hazard for eagles, hawks, and other birds large enough to simultaneously touch two energized wires or other hardware. Although this measure would eliminate any potential electrocution hazards, there is no evidence that the current design has resulted in any injury or mortality to large birds. Raptor monitoring and recording of incidental observations of bird collisions/electrocutions would allow PG&E to determine whether project power poles and other structures are negatively affecting avian resources and to take appropriate measures to correct any problem power poles.

Mammals (Carnivores)

Forest carnivores, such as the American marten, Pacific fisher, and Sierra red fox could occur in the project area. Proposed mitigation measures for project-related effects on mammals are presented below under *Wildlife Movement and Mortality*.

FWS filed a 10(a) recommendation recommending that PG&E develop a Pacific fisher management plan to protect this species within carnivore management areas, and that PG&E prevent the use of second-generation anticoagulants within the project area.

In regard to anticoagulants, PG&E states in its correspondence with FWS that it adheres to federal, state, and local laws pertaining to the use of rodenticides.

Our Analysis—American marten, Pacific fisher, and Sierra Nevada red fox can be affected by the proposed project, including O&M activities such as hazard tree removal or brush pile removal during maintenance of fire breaks along roadsides, canals, transmission lines, and recreation facilities. Recreation activities restricted to campgrounds and reservoirs, such as swimming and boating, are unlikely to have an effect on these species because the activities are restricted in area and period of use and are likely avoided by forest carnivores. However, dispersed recreation activities such as camping, hiking, and OHV use may overlap with suitable habitat, and may result in disturbances to breeding activities.

Although Pacific fisher designated carnivore management areas overlap with some of the project areas, the existing populations of Pacific fisher do not overlap with the project boundary. The development of a Pacific fisher management plan, as recommended by FWS, would add limited protection to this species due to its lack of use of the available habitat within the project boundary.

PG&E is bound by federal, state, and local laws pertaining to the use of rodenticides as part of O&M activities. These products, if legally registered for use within the State of California and used as directed on the product labels, are suitable for use. Use of anti-coagulants on federal lands would require approval from the Forest Service or BLM.

Special Status Bats

Special status bat species could potentially use project structures and facilities for day or night roosts as well as maternity sites during the breeding season. Individuals could be harmed if directly disturbed or excluded from the structures.

Forest Service condition 34 specifies that PG&E document all known bat roosts within project buildings, dams, or other structures that may be used as roosting structures within 1 year of license issuance and present results during the annual consultation meeting (DS-GEN1). PG&E would, where feasible, place humane exclusion devices to prevent occupation by bats. Devices would be placed when bats are absent from the facility or structure between November 1 and February 28. If overwintering bats are present in the facility, installation of exclusion devices would be delayed. Exclusion devices would be inspected annually, and facilities would be reevaluated for roosting bats every 3 years.

California Fish and Wildlife submitted a 10(j) recommendation similar to Forest Service condition 34 regarding management of bats in Drum-Spaulding.

Our Analysis—Eight project facilities were found to have signs of bat use; however, there was no evidence of day roosts in any of these facilities. Project O&M activities at these facilities, which occur during daylight hours, would not affect night-roosting bats. PG&E is unaware of any

information indicating that project facilities adversely affect bats. There are no proposed changes to the project that would reasonably affect bats; thus the proposed project would have a minor effect, if any, on bats.

Forest Service condition 34 would be protective of bat species found within the project area. Surveys of all known roosting structures would be conducted and the results presented at the annual consultation meeting. If bat use were determined to occur, humane exclusion devices would be installed at the correct time of year to prevent re-occupation by bats of project facilities, minimizing potential effects to special status bat species.

Wildlife Movement and Mortality

Project conduits and facilities such as open canals, elevated flumes, non-elevated or bench flumes, siphons, tunnels, and penstocks can present barriers to wildlife movement and have the potential to result in entrapment or mortality of wildlife.

To address the issue of wildlife loss in project canals, PG&E proposes to monitor and record animal losses in project canals (DS-TR2) and to consult with California Fish and Wildlife and the Forest Service when replacing wildlife escape and wildlife crossing facilities (DS-TR3). PG&E staff would record animal losses in project canals including the following details: (1) location of the dead animal; (2) species; (3) date and time of observation; (4) suspected cause of death; (5) photograph; (6) estimated size; (7) estimated age; and (8) sex, if known. PG&E would also consult with California Fish and Wildlife, the Forest Service, and BLM regarding the protection and utilization of wildlife resources affected by the project. PG&E would consult with the California Fish and Wildlife prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals. PG&E would assess wildlife escape facilities annually to ensure they are functional and in proper working order.

BLM condition 12 is identical to the proposed measure submitted by PG&E regarding monitoring animal losses in project canals. Forest Service condition 34 is similar to the PG&E proposal; however, it specifies that PG&E prepare an annual report including recommendations to address animal mortalities and a schedule for implementation of these recommendations. The report would be provided to the Forest Service, BLM, and California Fish and Wildlife, and would be filed with the Commission, including evidence of consultation.

Forest Service condition 34 and BLM condition 11 are identical to the PG&E's proposal to consult with California Fish and Wildlife prior to replacing wildlife crossing facilities.

California Fish and Wildlife submitted 10(j) recommendations similar to Forest Service condition 34 regarding the monitoring of animal losses in project canals and consultation with California Fish and Wildlife when replacing wildlife escape and crossing facilities.

Forest Service condition 34, submitted as separate subsections, specifies wildlife crossings conditions in the Drum, South Yuba, and Towle canals and in the Bear and South canals. The condition specifies that PG&E submit a wildlife crossing plan, within 1 year of license issuance, for the Drum, South Yuba, and Towle canals and one for the Bear and South canals that is integrated with wildlife escape structures and exclusion fencing to reduce wildlife mortality. The conditions also contain information regarding the segments of conduits for the location and dimension for crossing structures. Overcrossings would meet the minimum dimensions of 12-foot width, 8-foot-high side railings, and access ramps less than 30 percent grade, and undercrossings would meet the minimum dimensions of 10 feet high by 10 feet wide with natural substrate. Upon agreement by the Forest Service, BLM, and California Fish and Wildlife, PG&E may retrofit or redesign existing

features. Crossing structures would be placed approximately every 0.75 mile in combination with natural landscape crossings. The wildlife crossing plan would also include an implementation plan and annual monitoring and reporting of crossing structures. Implementation would begin 2 years from license issuance, and completion would occur within 5 years.

BLM condition 10 specifies wildlife crossing conditions for the Bear River and Drum (Chalk Bluff) canals. This condition specifies that PG&E submit a wildlife crossing plan, within 1 year of license issuance, for the Bear River, Drum, and Chalk Bluff canals and one for the Bear and South canals that is integrated with wildlife escape structures and exclusion fencing to reduce wildlife mortality. The conditions also contain information regarding the segments of conduits for the location and dimension for crossing structures. Overcrossings would meet the minimum dimensions of 12-foot width, 8-foot-high side railings, and access ramps less than 30 percent grade, and undercrossings would meet the minimum dimensions of 10 feet high by 10 feet wide with natural substrate. Upon agreement by the Forest Service, BLM, and California Fish and Wildlife, PG&E may retrofit or redesign existing features. Crossing structures would be placed approximately every 0.75 mile in combination with natural landscape crossings. The wildlife crossing plan would also include an implementation plan and annual monitoring and reporting of crossing structures. Implementation would begin 2 years from license issuance, and completion would occur within 5 years.

California Fish and Wildlife submitted a 10(j) recommendation similar to Forest Service condition 34 regarding wildlife crossings in Drum, South Yuba, Towle, Bear, and South canals.

PG&E's alternative condition to Forest Service condition 34 provides for the removal of Towle canal from the condition, including the removal of the wildlife crossing plan and implementation of wildlife crossing structures in Towle canal. PG&E also includes specific locations within each canal where new crossings would be constructed or the footbridge of existing crossings would be retrofitted. PG&E's alternative condition would reduce the minimum dimensions of the overcrossings, as compared to Forest Service and BLM conditions, to 8-foot width, 4-foot-high side railings, and access ramps less than or equal to 40 percent grade. PG&E's alternative condition includes retrofitting identified existing crossings by replacing or covering the existing metal footbridge decks with wood or similar synthetic material, and replacing stairs with unobstructed access ramps. The distance between crossings is proposed to increase, as compared to Forest Service and BLM conditions, to approximately 1 mile.

PG&E's alternative condition to BLM condition 10 involves construction of new crossing structures following the minimum overcrossings dimensions of 8-foot width, 4-foot-high side railings, and access ramps less than or equal to 40 percent grade. Additionally, PG&E alternative condition includes retrofitting identified existing crossings by replacing or covering the existing metal footbridge decks with wood or similar synthetic material, and replacing stairs with unobstructed access ramps. The alternative condition also would decrease the distances between crossings to approximately 1 mile.

Our Analysis—Project conduits (open canals, elevated flumes, non-elevated or bench flumes, siphons, tunnels, and penstocks) and other project facilities can present barriers for wildlife present in the project boundaries. These barriers can disrupt the natural movement of wildlife species and lead to species entrapment and mortality. Animals attempting to cross open diversion canals can drown because they can enter the canal but have difficulty escaping due to the smooth sides of the canal. Canals also provide a source of water for wildlife. None of the Drum-Spaulding Project conduits bisect summer, critical summer, winter, and critical winter mule deer habitat, but rather parallel the ridges likely used as migration routes between the habitat types (PG&E and NID, 2011h).

Wildlife passage points were found to be common throughout the Drum-Spaulding Project, with penstocks and tunnels having the greatest opportunity for passage by the five target species. Generally, penstocks and tunnels are either completely buried or have passage opportunities at intervals less than 0.5 mile apart throughout their entire length. However, some conduits contained segments that do not provide passage at least every 0.5 mile: Drum canal, Chalk Bluff/South Yuba canal, Bear River canal, Upper Wise canal, Lower Wise canal, and South canal. The greatest distance between passage opportunities on the Drum-Spaulding Project occurs on the Bear River canal, where distances between crossing points are up to 1.62 miles.

Most project conduits have few wildlife entrapment points, and all consist of grizzlies (i.e., trashracks) installed at pipe, siphon, or tunnel intake locations. The Drum-Spaulding Project has 17 entrapment points, including: vehicle ramps; low-angle banks—natural or gunite; and low-angle banks—gunite with benches. At the Drum-Spaulding Project, 77 wildlife mortalities were reported in 2009. Mortalities included 40 mule deer and 1 black bear; 36 mortalities were species not targeted by the study. Of the mule deer mortalities, 29 were associated with the Bear River canal, 8 with the South canal, 2 with the Chalk Bluff canal, and 1 each with Upper Wise canal and Drum canal (PG&E and NID, 2011h).

Drum, South Yuba, and Towle Canals

The Drum canal includes segments of excavated canal, pipe, flume, and tunnel. Passage points are common along the canal and include elevated flumes, open- and closed-grate footbridges, and wooden, dirt, and paved road crossings. In some cases, wooden planks have been placed on open-grate footbridges to increase potential for deer passage. Four sections of the canal have more than 1 mile between crossings, with the largest distance between crossings being 1.47 miles. The Drum canal experienced one wildlife mortality in 2009.

The 14.92-mile-long South Yuba canal contains several passage points including elevated flumes, paved roads, and closed-grate footbridges. In certain segments of the South Yuba canal, project facilities, such as bench flumes and pipes, present barriers to wildlife due to their height or limited clearance. No mortality was reported in 2009.

The 3.9-mile-long Towle canal conduit includes a tunnel, several excavated canal segments, five flume segments, and a pipe segment. Passage crossings are common throughout the canal and consist of flume, closed-grate footbridge, and dirt road crossings. Several segments of the canal are characterized by low banks, shallow water depths, low-velocity water, and narrow width, allowing wildlife to cross the canal. No mortalities were reported at the Towle canal.

The wildlife crossing plan for the Drum, South Yuba, and Towle canals specified in Forest Service condition 34 and recommended by California Fish and Wildlife would result in crossings at least every 0.75 mile and crossings would meet the following specifications for overcrossings: minimum dimensions of 12-foot width, 8-foot-high side railings, access ramps less than 30 percent grade for overcrossings, and minimum dimensions of 10 feet high by 10 feet wide with natural substrate.

Although the Forest Service provided general locations for new or retrofitted wildlife structures, PG&E's alternative identifies specific locations for wildlife structures within the Drum and South Yuba canals, and indicates whether the structure would be a new wildlife crossing or retrofitting an existing structure. PG&E's plan would provide for crossings every 1 mile and overcrossings would have minimum dimensions of 8-foot width, 4-foot-high side railings, and access ramps less than 40 percent grade.

There is limited information on the appropriate minimum specifications for wildlife crossings. PG&E, the Forest Service, and BLM base the distance between crossings on a study by Bissonette and Adair (2008). Bissonette and Adair (2008) found that placing wildlife crossings at a distance of 1 mile or less provides for daily movement across roads for most terrestrial animals (including the target species, deer, bear, and mountain lion) found in North America. The Forest Service and BLM rationale for wildlife crossing distances incorrectly cites the study as indicating that optimal distances are less than 1 mile (i.e., 0.75 mile).

The Forest Service and California Fish and Wildlife based their recommendations on the Clevenger and Huijser (2011) study of wildlife crossings at two- and four-lane highways, which is not directly applicable to passage over water conveyance structures. PG&E's alternative based its recommendations on Reclamation's 1972 technical report entitled "Reducing Hazards to People and Animals on Reclamation Canals." This report indicates that crossing structures measuring 8 feet wide or more are efficient for deer on the Colorado-Big Thompson and Rouge River Projects. However, this report also indicated that deer-proof fences should be at least 7.5 feet high. Other studies have shown the adequacy of deer bridges less than 8 feet wide (Gubser, 1960; Fry, 1983). Therefore, it is likely that 8-foot-wide crossing would provide adequate passage for target wildlife species.

PG&E's alternative condition outlines seven specific locations within both the Drum and South Yuba canals where new crossings would be constructed or the footbridge of existing crossings would be retrofitted. PG&E would retrofit the existing footbridges of three specific wildlife crossing structures in the Drum canal (mile 5.3, 6.7, and 8) and four specific wildlife crossing structures in the South Yuba canal (mile 4.3, 5.1, 8.1, and 9.4); and it would construct four wildlife crossing structures in the Drum canal (mile 0.5, 2, 5, and 6) and three wildlife crossing structures in the South Yuba canal (mile 8.8, 9.6, and 11.5). This condition would ensure that wildlife crossings are located no more than 1 mile apart. The 8-foot width has been shown to provide adequate wildlife passage. The 4-foot-high side railings, however, may not be sufficient. Deer, especially when chased, can easily jump over 4-foot-high railings. Side railings that are 8 feet high would better prevent deer from entering the canals (Duffy et al., 1988).

Since there have been no mortalities in Towle canal and numerous passage points, building or retrofitting wildlife crossings structures in the Towle canal would not provide additional protection to target wildlife species.

Bear River, South, and Chalk Bluff Canals

The Bear River canal has 28 passage points in a distance of 22 miles; 4 sections have more than 1 mile between crossings, with the longest gap between crossings of 1.62 miles. Passage points consist of paved and dirt road crossings, open- and closed-grate footbridges, and wooden bridges. However, not all of the passage points found within the Bear River canal are suitable for terrestrial mammals, specifically metal grate footbridges. As stated above, the Bear River canal experienced 29 mule deer mortalities in 2009, which is about 71 percent of target species mortalities associated with the project.

The 5.4-mile-long South canal includes several excavated canal segments, two tunnels, and nine flume segments. Passage points are common along the canal, most crossings are less than 0.5 mile apart; the largest distance between crossings is 0.78 mile. Passage points consist of paved road crossings, wooden bridges, and passage over penstocks. The South Canal experienced the mortality of eight mule deer in 2009.

The 3.21-mile-long Chalk Bluff canal contains 12 existing crossings including wooden footbridges and Lennon flumes. Additionally, most of the Chalk Bluff canal is characterized by shallow

water depth, narrow width, and slow to moderate velocity, allowing wildlife to cross across most of the canal. The Chalk Bluff canal experienced two wildlife mortalities in 2009.

The wildlife crossing plan specified by BLM condition 10 for the Bear River, Drum (discussed above), and Chalk Bluff canals and Forest Service condition 34 for the Bear River and South canals would provide for wider crossing at more frequent intervals than PG&E's alternative conditions. As discussed above, 8-foot-wide crossings with 8-foot-high railings every 1 mile would adequately protect wildlife.

The Chalk Bluff portion of the South Yuba/Chalk Bluff canal consists of a 3.21-mile stretch with 12 existing crossing structures; in addition, most of the canal is crossable by target species. Thus, additional crossing structures in the Chalk Bluff portion of the South Yuba/Chalk Bluff canal would not provide additional protection to target wildlife species.

Consultation Prior to Replacing Wildlife Crossings

PG&E's proposed measure to consult with California Fish and Wildlife and appropriate agencies prior to replacing wildlife crossings is identical to Forest Service condition 34 and BLM condition 11. This measure would protect wildlife movement because it would allow appropriate coordination between PG&E and agencies, and it ensures that if wildlife escape and crossing facilities become degraded and need replacement during the term of a new license, up-to-date standards would be applied to ensure the continued protection of target wildlife species.

Monitoring Animal Mortalities

PG&E proposes to monitor animal mortalities in project canals and record any pertinent information. Forest Service condition 34 is similar to PG&E's proposed measure to monitor animal losses, but contains additional measures specifying that PG&E prepare, and submit to appropriate agencies, a report including recommendations for measures to address animal mortalities in project canals and a schedule of implementation. PG&E would file this report with the Commission, and implement resource management measures required by the Commission. Monitoring would detect any changes and trends in wildlife mortality and identify the need for additional protective measures. Implementation of Forest Service condition would be more protective for wildlife movement activities within the project boundary because it would ensure that PG&E monitors and record animal mortalities, and if needed, develop appropriate recommendations to reduce wildlife mortalities in a timely manner.

Yuba-Bear Project

Wildlife (General)

Terrestrial wildlife species within the project boundary have become accustomed to the O&M activities associated with the Yuba-Bear Project. Mobile wildlife species intolerant of disturbance would be expected to flee during periods of project O&M and return when the activities have ceased. In general, the effects of NID's O&M activities would generally be temporary and not severe enough to negatively affect the survival of a species or population.

Activities associated with the construction and future O&M for the proposed Rollins powerhouse no. 2 are unlikely to affect most terrestrial wildlife species, because the powerhouse would be located immediately adjacent to an existing powerhouse. Construction would not require the removal of vegetation important to nesting activities for neotropical birds or other avian species, and

Rollins dam would provide a physical buffer between the proposed powerhouse and the surface of Rollins Reservoir, an area that supports migratory waterfowl and shore birds.

Project effects on wildlife, agency conditions related to wildlife, and NID's proposed wildlife measures are discussed below for various wildlife resources.

Special Status Wildlife Species

General

The project could affect special status wildlife species as a result of maintenance activities and recreational use.

NID proposes to review annually special status species lists and assess the possibility of new species on federal land, would apply to the protection of special status wildlife species in the project area (YB-GEN3). In addition, annual consultation with appropriate agencies (YB-GEN1) and annual employee training (YB-GEN2) would reduce effects to special status wildlife species. Annual consultation would (1) ensure that NID's planned activities are efficiently coordinated to the extent possible with Forest Service and BLM activities; (2) make the Forest Service and BLM aware of NID's planned O&M activities on Forest Service land and on land administered by BLM; and (3) make NID aware of all pertinent Forest Service and BLM orders, rules, and policies that might affect the planned activities. NID would meet with the Forest Service, BLM, and other agencies to discuss NID's planned O&M activities. NID would prepare and maintain a map of sensitive areas within the project boundary. The map would show known areas of special status wildlife populations and cultural sites as well as protected activity centers and other protected or restricted areas. NID would provide environmental sensitivity training to staff and provide group training to all staff annually. Training would include general identification of special status species known to occur in the project area and their location within the project boundary and methods to avoid sensitive areas and minimize disturbance of special status species during critical life stages.

NID's proposed measures to annually consult with appropriate agencies and perform annual employee training are consistent with Forest Service condition 1 for annual consultation and condition 28 for annual employee training; BLM condition 1 for annual employee training and condition 42 for annual consultation; and California Fish and Wildlife 10(j) recommendation 1 for annual employee training and 10(j) recommendation 1 for annual consultation.

In the Vegetation Management Plan, NID establishes protection measures for vegetation management activities with the potential to affect directly special status wildlife by way of habitat modification, and disturbance through mechanical noise. A limit of operating period would be applied to activities that involve use of heavy equipment, loud noises, or habitat alteration to protect special status wildlife.

BLM condition 21 and Forest Service condition 34 are similar to the proposed annual review of special status species and specify that NID annually review lists of special status species that may be affected by project activities.

NID proposes to consult with appropriate federal agencies prior to construction activities on federal land (YB-GEN5). NID would submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation would assess the potential effects of the proposed action on special status species or their habitats, and would include components such as: (1) avoidance or minimization of adverse effects to special status species; (2) compliance of project-related activities to protective

measures in management plans for special status species; and (3) development of implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species. If necessary, Forest Service or the BLM may require mitigation techniques.

Forest Service conditions 12 and 34 and BLM conditions 20 and 52 are identical to NID's proposed measure regarding consultation prior to building of new facilities on federal land and specify that NID submit a biological evaluation prior to construction activities that may disturb special status species or critical habitat (YB-GEN5).

Our Analysis—Project activities that can potentially affect special status species include (1) vegetation management activities such as removal of hazard trees, non-native invasive plant control, defensible space maintenance, and clearing of transmission line rights-of-way; (2) recreation activities such as OHV use, camping and hiking; and (3) facility maintenance activities such as inspections, road grading, annual repairs, and emergency repairs.

NID's proposal to annually consult with appropriate agencies, annually train employees regarding the location of special status species occurrences, and use BMPs in sensitive areas would provide protection to special status species within the project boundary. Forest Service condition 34 is similar to NID's condition to review special status species annually, but includes additional measures for the protection of special status species in the case of adverse effects from project activities, and contains requirements for notification to state and federal agencies if rare, threatened, and endangered species are detected. Implementation of the Forest Service condition would provide a mechanism for the evaluation of effects of project operation and maintenance on newly listed species and development of appropriate protective measures.

Before construction of any project features not addressed in this EIS, NID would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special-status species would be developed if appropriate as part of the license amendment proceeding. NID's proposal to consult with federal agencies prior to construction activities in federal land, Forest Service conditions 12 and 34, and BLM conditions 20 and 52 are repetitive of the license amendment process for construction activities not addressed in this EIS.

Amphibians and Reptiles

Project O&M could potentially affect the foothill yellow-legged frog, coast horned lizard, and western pond turtle.

A breeding population of foothill yellow-legged frog was identified in Steephollow Creek during relicensing studies. NID proposes (YB-AQR4) to monitor this population in an area 1,000 meters upstream from confluence with the Bear River to assess what effect spills from the Chicago Park conduit have on this population. A baseline survey would occur during the first full calendar year following issuance of the license. During the second and third year, surveys would be conducted associated with four spill events at the conduit. This monitoring program is essentially the same as BLM condition 10, Forest Service recommendation 8, and California Fish and Wildlife recommendation 2.11.

Forest Service condition 35 and BLM condition 23 specify and California Fish and Wildlife recommendation 8 recommends monitoring components for special status species: foothill yellow-legged frog and western pond turtle. The monitoring components include: (1) reaches to monitor; (2) number of sites and frequency of monitoring; (3) distribution and population metrics; (4) habitat and environmental conditions to monitor; and (5) reporting of the monitoring program.

NID's alternative to Forest Service condition 35 and BLM condition 23 includes foothill yellow-legged frog as a target species in the Aquatic Monitoring Plan, filed with the Commission on August 29, 2012. NID proposes to monitor foothill yellow-legged frog with methods similar to those used during the relicensing surveys. Foothill yellow-legged frog monitoring would be conducted in stream reaches where breeding populations of foothill yellow-legged frog have been documented and where data are needed to assess response to flow-related changes in habitat conditions during the new license. Where possible, NID proposes to sample at the same locations as relicensing surveys to allow for comparison to conditions prior to new license measure implementation. The reaches proposed by NID include: (1) the Middle Yuba River below Milton diversion dam at Wolf Creek; (2) Canyon Creek below Bowman-Spaulding diversion dam at Little Canyon Creek; and (3) Bear River below Dutch Flat afterbay dam at a site to be determined.

Monitoring would be performed during the first 2 full years following license issuance; in years 5, 6, 9, and 10; and then at 6-year intervals. NID states that the intervals between survey periods should be sufficient to document recruitment into the adult population and to characterize the population response to flow conditions under the new license. Water temperature, a critical factor in balancing streamflow measures for protection and enhancement of both resident rainbow trout and populations of foothill yellow-legged frog, would be monitored by NID at key locations and throughout the seasons that the sites can be safely accessed.

Additionally, according to NID's Vegetation Management Plan, any pesticide application that is deemed necessary to use on federal land within 500 feet of known populations of California red-legged frog, Sierra Nevada yellow-legged frog, or foothill yellow-legged frog would be designed to avoid adverse effects to individuals and their habitats.

NID proposes to record incidental observations of western pond turtle as part of any aquatic monitoring activity. NID's relicensing study results for western pond turtle, including accumulated incidental observations, known records, and the results of surveys on Canyon Creek and the Middle Yuba River, provide no evidence that western pond turtle occurs in project-affected stream reaches (PG&E and NID 2010c, 2010k). NID provides the following rationale for making incidental observations rather than a more quantitative survey. Western pond turtle is an amphibious species that spends a large part of the year and critical life stages, including nesting (i.e., egg laying), in terrestrial habitat that would be unaffected by streamflow changes. Terrestrial-dependent nest success and hatchling survivorship are believed to be the critical life stages for western pond turtle population growth and success. Practical methods to monitor the western pond turtle hatchling/juvenile stage have not been developed by researchers, except in unusual circumstances where nesting areas are known.

The Foothill Water Network submitted comments supporting NID's YB-AQR4.

FWS filed a 10(a) recommendation that NID develop a bullfrog eradication plan for all project lakes, reservoirs, and impoundment areas.

Our Analysis—Proposed changes in minimum stream flows and associated changes in water temperature and spill cessation measures have the potential to affect aquatic habitat of these species. Overall it is expected that these measures would improve habitat and provide greater protection for these species; however, while proposed spill cessation measures would reduce stranding and enhance survival of early life stages of foothill yellow-legged frog, concern has been expressed that cooler water temperatures maintained by higher flows could adversely affect foothill yellow-legged frog in some reaches.

Detections of foothill yellow-legged frog, varying from low to high numbers, were reported at the Milton diversion dam, Bowman dam, Dutch Flat afterbay, and Rollins dam; however, at these

sites, the proposed minimum streamflow schedule would provide substantial suitable habitat and would not adversely affect foothill yellow-legged frog (section 3.3.2.2.2, *Aquatic Resources, Instream Flows*). No specific minimum streamflow has been proposed for the Bear River below Chicago Park powerhouse; flow in this reach is affected by the specified minimum flow at the upstream Dutch Flat afterbay dam and accretion over the interim reach to the Chicago Park powerhouse. Incidental observations of foothill yellow-legged frog have been reported downstream of the Chicago Park powerhouse, one of which indicated limited breeding. Suitable habitat is situated almost entirely within a relict channel, not in the main channel; thus, no effects are expected from the proposed project.

The Chicago Park powerhouse reach is within the expected foothill yellow-legged frog population range and adjacent to robust foothill yellow-legged frog populations (i.e., upstream Dutch Flat afterbay reach and tributary Steephollow Creek); however, no suitable foothill yellow-legged frog habitat was located within the reach, and a flow-habitat analysis was not developed. In the Chicago Park powerhouse reach of the Bear River, foothill yellow-legged frog breeding is largely limited to a backwater area unaffected by high flows.

Texas Creek diversion dam reach, Fall Creek diversion dam reach, Trap Creek below the Bowman-Spaulding conduit reach, and Rucker Creek before Bowman-Spaulding conduit reach were all partially within the foothill yellow-legged frog elevation range; however, the reaches are unlikely to support foothill yellow-legged frog populations, and flow-habitat analyses were not developed for these reaches.

Foothill yellow-legged frogs were detected in the Bowman-Spaulding diversion dam reach. Percent WUA under existing conditions for foothill yellow-legged frog eggs was above 80 percent for extreme critically dry water years, critically dry water years, dry water years, below normal water years, and above normal water years, but below 80 percent for wet water years. Percent WUA for foothill yellow-legged frog tadpoles was above 80 percent for all water years except for above normal water years and wet water years.

Possible ramping effects on foothill yellow-legged frog, including stranded or trapped tadpoles in isolated pools, could occur on the stream reaches where this species breeds (Middle Yuba River downstream of Milton diversion dam; Canyon Creek downstream of Bowman dam; and Bear River downstream of Dutch Flat afterbay dam, Chicago Park powerhouse, and Rollins dam). On the Middle Yuba River below Milton diversion dam, spills are closely associated with precipitation events and snowmelt. In this reach, foothill yellow-legged frogs were detected in high numbers. Percent WUA under existing conditions for foothill yellow-legged frog eggs and tadpoles was above 80 percent for all water years.

Spills generally do not occur on the Bear River below Dutch Flat afterbay dam as spill flows at this location are diverted via the Chicago Park flume to the Chicago Park forebay. Foothill yellow-legged frogs were found in moderate to high numbers for all life stages in the Dutch Flat afterbay dam reach. Percent WUA under existing conditions for foothill yellow-legged frog eggs was above 80 percent for extremely critically dry and critically dry water years, but below 80 percent for dry, below normal, above normal, and wet water years. Percent WUA for foothill yellow-legged frog tadpoles was above 80 percent for all water years.

Flow levels typically found in the Bear River canal diversion dam reach of the Bear River below Rollins dam during the foothill yellow-legged frog breeding and rearing period are higher than would be found in the unimpaired condition, which limits suitable, low-velocity edgewater habitat. In the Rollins dam and powerhouse reach, foothill yellow-legged frogs were detected in low

numbers. Percent WUA for foothill yellow-legged frog eggs and tadpoles was above 80 percent for all water years, except for being 78 percent for frog eggs for wet water years.

Down-ramping is similar under both unimpaired and regulated flows and is not an issue. The proposed project includes a supplemental flow for whitewater boating in September in Canyon Creek below French dam. The reach is above the elevation range for foothill yellow-legged frog, and Sierra Nevada yellow-legged frog does not occur; thus, no adverse effects from pulse flows are expected.

The following reaches are above the foothill yellow-legged frog elevation range and are not expected to affect foothill yellow-legged frog populations: Jackson Meadows dam reach; Wilson Creek diversion dam reach; Jackson Lake dam reach; French Lake dam reach; Faucherie Lake dam reach; Sawmill Lake dam reach; and Clear Creek below Bowman-Spaulding conduit reach.

Aquatic monitoring during implementation of new license conditions would provide information necessary to assess the effects of flow modifications on special status species.

Measurement of appropriate critical habitat conditions would be an important component of a monitoring program to evaluate the effects of flow-related habitat changes on special status species, foothill yellow-legged frog in particular.

Forest Service condition 35 and BLM condition 23 for a monitoring program include the following target species: foothill yellow-legged frog, western pond turtle, rainbow trout and other native fish species of interest, aquatic benthic macroinvertebrates, and aquatic invasive species. NID's Aquatic Monitoring plan proposes monitoring for stream fish, foothill yellow-legged frog, and incidental observations of the western pond turtle and aquatic invasive species. Monitoring for stream fishes in the Aquatic Monitoring Plan is discussed in section 3.3.2.2.8, *Aquatic Biota*.

The Forest Service and BLM's monitoring program condition specifies that NID conduct annual monitoring within the first 10 years of license issuance, and after 10 years NID, would consult with agencies to determine if annual monitoring should continue. In its Aquatic Monitoring Program, NID proposes to monitor annually within the first 2 years of license issuance, and in years 5, 6, 9, and 10; after this, NID would monitor at 6-year intervals.

The Forest Service and BLM specify that monitoring for the foothill yellow-legged frog and western pond turtle should occur at one to four survey sites in most large reaches within the project. NID's plan would require monitoring foothill yellow-legged frog in reaches where breeding populations of the frog have been documented and where data are needed to assess response to flow-related changes in habitat conditions under the new license. NID proposes to monitor three sites in three reaches with evidence of foothill yellow-legged frog breeding. NID would only note incidental observations of western pond turtle.

NID's plan provides a focused monitoring program for foothill yellow-legged frog in project-affected reaches with documented populations of the species that could be influenced by flow modifications proposed for the new license. NID's proposed Aquatic Monitoring Plan includes sufficient monitoring to be able to detect effects of project operation on the foothill yellow-legged frog. Specifically, NID would monitor for the foothill yellow-legged frog only in streams with previous evidence of breeding populations because the species appears to have a breeding range within the project boundary that is strongly influenced by elevation. Most of the aquatic habitat within the project boundary is above the known elevational requirements of this species. Given the strong relationship of flow and water temperature in some of these reaches and the concern for balancing habitat conditions for resident rainbow trout and foothill yellow-legged frog, continuous water temperature monitoring proposed in

selected reaches should provide valuable information, in conjunction with biota surveys, to assess potential project flow-related effects.

In addition to NID's proposed Aquatic Monitoring Plan, NID's proposed measure (YB-AQR4) would monitor a breeding population of foothill yellow-legged frog identified in Steephollow Creek. Spills from the Chicago Park flume may occasionally release additional flow into Steephollow Creek that could adversely affect breeding populations of foothill yellow-legged frog. NID proposes to perform baseline monitoring of foothill yellow-legged frog in Steephollow Creek in the first full calendar year after license issuance and to repeat this monitoring in the second and third full calendar years after license issuance. In addition to baseline monitoring, event-based monitoring would occur beginning in the second full calendar year after a spill event and would be repeated in the third year following the spill event. A spill event requiring monitoring would be defined as (1) a spill of more than 100 cfs between April 1 and June 15, or (2) a spill of more than 300 cfs between June 16 and September 15. Monitoring would occur for 1,000 meters of Steephollow Creek upstream of the confluence with the Bear River and would be comprised of four surveys: two surveys in the spring focusing on adults and egg masses; one survey at least one month after the spring surveys focusing on tadpoles; and one survey in the late summer/fall focusing on metamorphosed juveniles. Survey methods would be consistent with the methods for visual encounter surveys and data analysis surveys performed during the 2011 relicensing studies (PG&E and NID, 2010f). Baseline and event monitoring in Steephollow Creek would provide protection to foothill yellow-legged frog and ensure that NID and appropriate agencies are aware of any spills that could adversely affect this breeding population.

PG&E and NID conducted a study to map potentially suitable western pond turtle aquatic habitat and nesting habitat, assembled information associated with incidental observations reported during relicensing studies from 2007 to 2009, and evaluated 41 sites, within both projects, on canals in areas below 6,000 feet of elevation associated with reservoirs, afterbays, forebays, canals, and stream reaches potentially affected by the projects. Project reservoirs, forebays, and afterbays lack suitable habitat to support western pond turtle populations, particularly adequate basking substrates and the vegetated, shallow water areas that are necessary for juvenile western pond turtle.

Minimum streamflows have been proposed for Jackson Meadows dam, Faucherie dam, Sawmill dam, Bowman dam, the Bowman-Spaulding diversion dam, and the Bear River below the Chicago Park powerhouse; however, there have been no detections of western pond turtle reported at these locations. No historical records or incidental observations of western pond turtle were recorded in these sites or their vicinity. Thus, no effects are expected to western pond turtle from the proposed project. Minimum streamflows have been proposed for the Milton diversion dam and the Rollins dam where western pond turtle have been reported; however, the proposed minimum streamflow schedule would not markedly change and would not adversely affect western pond turtle habitats—primarily pools and backwater areas—where the species occurs. In addition, the proposed project would not measurably affect water temperatures where western pond turtles occur.

Although western pond turtle may occur in some project-affected reaches, a focused monitoring program is not likely to generate useful data to evaluate western pond turtle population response to flow-related changes. Project flows are not likely to affect western pond turtle populations given their dependence on terrestrial habitat for the success of critical life stages. Aside from documenting occurrence, we do not see that the project-wide monitoring plan specified by the Forest Service and BLM, and recommended by California Fish and Wildlife would generate data useful for evaluating project effects or informing decisions for protection or enhancement of the species. Recording of incidental observation of western pond turtle during other monitoring surveys would be adequate for documenting locations of occurrence; if incidental observations indicate the need for focused surveys of site-specific

conditions, studies could be developed through the annual consultation process and the license can be reopened if necessary.

The proposed project potential effects of ramping on western pond turtle may be largely associated with spills that increase flows; however, western pond turtle are motile and presumably move to areas of quieter water as they would in response to natural increases in flow and to deeper water in response to stage decline. Because they often over-winter in upland sites, some of these spills may have no effect on western pond turtle. The proposed ramping rates for the Middle Yuba River downstream of Milton diversion dam and on the Bear River downstream of Rollins reservoir are comparable to or smaller than natural stage variability. In the Dutch Flat afterbay reach of the Bear River, rapid stage changes may occur during canal outages and spills, although natural changes in flow are likely to be more substantial. No western pond turtle were documented in Canyon Creek where supplemental pulse flow is proposed; thus, no adverse effects associated with pulse flows are expected.

Bullfrogs are non-native species that prey on yellow-legged frogs. Eradication of predators can be an effective means of conserving special status frog species. However, bullfrogs were introduced into California more than 100 years ago and are well established in lowland and foothills in California. They utilize stock and irrigation ponds, irrigation ditches, low gradients streams, impoundments, and other warm-water habitat; many of these habitats are situated on private property. Additionally, bullfrogs are capable of dispersing long distances over land and within stream systems. Thus, the recommendation for the development of a bullfrog eradication plan that addresses the project is impracticable.

Road maintenance activities such as grading have the potential to affect the coast horned lizard; however, NID is unaware of any information indicating that project facilities adversely affect coast horned lizard. Since NID proposes no changes to the project that would reasonably affect coast horned lizard, the proposed project is not expected to have an effect on coast horned lizard.

Project operations may result in decreased reservoir levels earlier in the year, which could have a potentially negative effect on breeding habitat for the Sierran treefrog and Sierra Nevada yellow-legged frog. Project operation affecting reservoir levels could also have a negative effect on Sierra Nevada yellow-legged frog that commonly used marshy edges of reservoirs.

Birds

Normal project O&M activities and increased recreational use could potentially disturb special-status bird species, such as the bald and golden eagle, northern goshawk, California spotted owl, and peregrine falcon. Avian impacts associated with project transmission lines can occur through electrocution or injury from collision.

In the final license application, NID proposes to implement a bald eagle management plan within 1 year of license issuance (YB-TR7). On June 28, 2012, NID filed a Bald Eagle Management Plan with the Commission. The plan provides guidance for the protection of bald eagles nesting within the project boundary that may be affected by the project, described measures consistent with federal and state guidelines to protect nesting birds, and described guidelines for consulting with appropriate agencies.

NID's Bald Eagle Management Plan is intended to provide guidance for the protection of bald eagles nesting within the project boundary that may be affected by project activities. NID would survey lands in selected project areas in the beginning of the first full calendar year after license issuance for bald eagle nests and every 5 years thereafter. The surveys would determine and confirm occupancy of territories, presence of eggs or nestlings, and determine nest success. Nest buffers of a 1,000-foot radius would be established around documented nests, and limits of operating periods would be established for all NID project-related activities within the buffer areas. NID would consult annually with appropriate

agencies prior to removal of any nest buffers. The plan contains specific information regarding activities that may or may not be allowed within the buffers and other appropriate restrictions. NID's Bald Eagle Management Plan is in accordance with Forest Service condition 34 and BLM condition 19, and the plan is consistent with current National Bald Eagle Management Guidelines.

In the Vegetation Management Plan, NID outlines limit of operation periods would be implemented for the California spotted owl (March 1 to August 15), the northern goshawk (February 15 to September 15), and the great gray owl (March 1 to August 15) to avoid sensitive breeding periods.

Forest Service condition 34 and BLM condition 19 specify that NID implement a Bald Eagle Management Plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and California Water Board.

California Fish and Wildlife also submitted a 10(j) recommendation recommending that NID implement a Bald Eagle Management Plan in consultation with the Forest Service, BLM, California Fish and Wildlife, and California Water Board.

NID proposes that project staff record incidental observations of bird collisions or electrocution along the Bowman-Spaulding transmission line (YB-TR3). Incidental observation reports would include information such as date of observation, location, species, number of birds, suspected cause of injury, and other pertinent information. NID would consult with the Forest Service, FWS, and California Fish and Wildlife regarding measures to ensure the protection of birds where incidental observations of collisions and electrocutions illustrate a problem pole or pole transmission structure. Measures may include retrofit or replacement of problem poles or transmission structures.

Forest Service condition 34 specifies that NID record annually all incidental observations of bird collisions and electrocutions along the Bowman-Spaulding transmission line. Observations would include date and location, species and number of birds, bird condition (i.e., dead or injured), band number, if available, and suspected cause of death. The condition also specifies the use of raptor-safe power lines as described in APLIC's "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006," or the most current edition of this document, for new power lines or when replacing existing structure such as poles, phase conductors, and associated equipment on project lands. If raptor collision monitoring indicates a substantial issue with raptor-project transmission line interactions, the poles where the interaction issue occurs would be replaced or retrofitted, as agreed with the Forest Service, FWS, and California Fish and Wildlife.

California Fish and Wildlife filed a 10(j) recommendation recommending the recording of incidental observations and use of the APLIC's suggested practices for new poles or when retrofitting existing poles. It also recommends NID that NID conduct an evaluation of project power poles within 1 year of license issuance and replace or retrofit any poles that are inconsistent with APLIC's suggested practices.

Our Analysis—Project operation may have effects on special status birds present within the project boundary. Although there are known willow flycatcher nesting habitats that intersect the Yuba-Bear Project boundary, the proposed project is not expected to have an effect on willow flycatcher. American peregrine falcons and golden eagles that are occasional visitors may be disturbed by recreation activities; vegetation clearing activities such as transmission line rights-of-way maintenance, fire clearance maintenance, and non-native invasive plant removal; and routine, intermittent facilities maintenance. These activities may lead to flushing of perched birds; however, given the infrequency of American peregrine falcon and golden eagle visits to the project area, the concentrated nature of potential disturbances, and the intermittent duration of activities, the proposed project would not have an adverse effect on American peregrine falcon and golden eagles.

The proposed project is expected to lead to an increase in recreationists and their activities, which has the potential to disturb foraging bald eagles. The degree to which bald eagles may be disturbed is dependent on the type and level of increase in activities and the tolerance of the birds to such activity. Activities such as camping and swimming are least likely to disturb foraging bald eagles, because they are generally restricted to specific areas and result in a minimal increase in noise. Activities that involve the use of motorized transportation, such as boating and OHVs, are most likely to disturb foraging bald eagles. Use of motorized boats results in increased noise and allows access to nearly all of a water body. Although OHV use is restricted, it may allow recreationists to access areas near foraging perches. Other activities, such as hiking, walking, and non-motorized flat-water boating, are relatively non-invasive with respect to an increase in noise, but they do allow for an increase in human presence in and around project reservoirs where bald eagles may forage; however, NID believes that the proposed project and the associated increase in recreation use would not have an adverse effect on bald eagles.

Project activities in the vicinity of northern goshawk and California spotted owl protected activity centers and their associated nests that may disturb nesting birds include vegetation management activities such as, removal of hazard trees, non-native invasive plants control, defensible space maintenance and clearing of transmission line right of way; recreation activities such as OHV use, camping, and hiking; and facility maintenance activities such as, inspections, road grading and annual repairs and emergency repairs. In general, most of these activities are ongoing, routine and limited in duration and area, and it is probable that the northern goshawk and the California spotted owl have become acclimated to the activities. Removal of hazard trees, emergency repairs and some recreation activities are not ongoing or routine and may occur in protected activity centers. These activities are most likely to affect breeding birds if they occur during the breeding period.

Activities associated with annual routine maintenance at the proposed Rollins powerhouse no. 2 may result in an increase in human presence during maintenance activities. Annual routine maintenance would be coordinated along with maintenance of the existing powerhouse and would be limited in duration. Given the physical barrier provided by Rollins dam, routine, intermittent maintenance activities are unlikely to disturb bald eagles.

Construction associated with the proposed recreation facilities changes or additions would result in a temporary increase in noise, groundborne vibration, fugitive air emissions, and general human activity. Since no known bald eagles nests occur within 1 mile of the proposed changes or additions, these temporary effects are unlikely to disturb nesting bald eagles. Some of the proposed changes or additions do have the potential to disturb foraging bald eagles; however, the level of disturbance would be temporary and minor, since construction is proposed in areas where ongoing recreation activities already exist, and no known roosts or hunting perches have been reported.

Activities associated with the construction of the proposed parking areas at the Milton diversion dam impoundment and at Sawmill Lake may affect willow flycatcher and bald eagle. These species are sensitive to disturbance during the breeding season. Construction activities would require vegetation removal, grading, installation of campfire rings, and picnic tables, which would lead to an increase in noise and human activities during the construction phase. Construction of the proposed additional parking at Pass Creek boat launch and at Bowman Lake has the potential to affect California spotted owl and northern goshawk. These species are also sensitive to disturbances during their breeding season, and construction activities would require removal of vegetation, grading, laying of asphalt, haul trucks, and installation of campfire rings and picnic tables, which would result in an increase in noise and human presence during construction activities.

Implementation of NID's Bald Eagle Management Plan, including nest buffers and limited operating periods, would identify and protect active eagle nests from disturbance and is sufficient for the protection of nesting bald eagles within the project boundary. Monitoring bald eagle nests would be useful in detecting changes in use and determining the need for protective measures. Monitoring would be increasingly important as bald eagle populations in California continue to grow and expand their range.

No raptor collisions or electrocutions have been reported at the Yuba-Bear Project switchyards or transmission lines (NID, 2011a).

Forest Service condition 34 is similar to NID's proposal to record incidental observations of bird collision/electrocution in the Bowman-Spaulding transmission line. However, the Forest Service condition includes additional protective measures regarding the use of APLIC's "Suggested Practices for Avian Protection on Power Lines" to replace or retrofit poles and other structures, and would be more protective of avian resources that habitually use powerlines and other energized equipment within the project boundary.

California Department of Fish and Wildlife recommends that NID conduct an evaluation of project transmission lines and replace or retrofit all power poles inconsistent with APLIC guidelines regardless of whether any mortalities have been associated with those poles. Transmission lines less than 69 kV can be an electrocution hazard for eagles, hawks, and other birds large enough to simultaneously touch two energized wires or other hardware. Although this measure would eliminate any potential electrocution hazards, there is no evidence that the current design has resulted in any injury or mortality to large birds. Raptor monitoring and recording of incidental observations of bird collisions/electrocutions would allow NID to determine whether project power poles and other structures are negatively affecting avian resources and to take appropriate measures to correct any problem power poles.

Mammals (Carnivores)

Forest carnivores such as the American marten, Pacific fisher, and Sierra red fox could occur in the project area.

Proposed measures to mitigate for effects on wildlife are presented below under *Wildlife Movement*.

FWS filed a 10(a) recommendation recommending that NID develop a fisher management plan to protect this species within carnivore management areas, and that NID prevent the use of second-generation anticoagulants within the Project area.

Our Analysis—American marten and Pacific fisher could be affected by the proposed project, including O&M activities such as hazard tree removal or brush pile removal during maintenance of fire breaks along roadsides, canals, transmission lines, and recreation facilities. Campgrounds associated with the project are unlikely to have an effect on any of these species since the campgrounds are restricted in area and period of use and are probably avoided by these species; however, dispersed recreation activities such as camping, hiking, and OHV use may overlap with suitable habitat for these species.

Activities associated with the construction of the proposed parking areas at Sawmill Lake and at Pass Creek boat launch may affect Pacific fisher, which is sensitive to disturbances during the breeding season. Construction activities would require vegetation removal, grading, laying of asphalt, haul trucks, installation of campfire rings, and picnic tables, which would lead to an increase in noise and human activities during the construction phase.

Although Pacific fisher designated carnivore management areas overlap with some of the project areas, the existing populations of Pacific fisher do not overlap with the project boundary. The development of Pacific fisher management plan, as recommended by FWS, would add limited protection to this species due to its lack of use of the available habitat within the project boundary.

NID is bound by federal, state, and local laws pertaining to the use of rodenticides as part of O&M activities. These products, if legally registered for use within the State of California and used as directed on the product labels, are suitable for use.

Special Status Bats

NID proposes to survey project structures for bat roosts and establish humane exclusion devices in structures that may be used as bat roosts (YB-TR6). NID would document all known bat roosts within project buildings, including powerhouses and storage building valve houses, dams, or other structures that may be used as bat roosts. NID would provide these results to California Fish and Wildlife and other appropriate agencies. If bats or roosting signs are documented where staff has daily or weekly routine presence, bats would be humanely removed and humane exclusion devices would be installed to prevent further occupation. Exclusion devices would be inspected annually, and facilities reevaluated for roosting every 3 years.

Forest Service condition 34 and BLM condition 22 specify bat management measures for NID that are identical to NID's proposed bat management measures.

California Fish and Wildlife filed a 10(j) recommendation identical to NID's proposed bat management measures.

Our Analysis—Six project structures at Yuba-Bear were found to have signs of bat use; three structures were classified as day roosts and the remaining three structures as night roosts. The structures classified as night roost are unlikely to be affected by the proposed project since their presence does not coincide with normal work hours by project staff. One of the structures classified as day roosts was the employee housing at Bowman powerhouse, and due to human health concerns, the bats were humanely excluded from this structure. Project activities that may affect the two remaining day roosts include recreation and O&M activities.

Two special status bats, Western red bat and Townsend's big-eared bat, were recorded at the site selected for the proposed Rollins powerhouse no. 2. No Townsend's big-eared bats are known to roost at the site proposed for the powerhouse and would not be affected by construction of the proposed powerhouse. The initial construction would not involve the removal of any trees where Western red bats roost and, therefore, would not affect this species.

Forest Service condition 34 and BLM condition 22 are identical to NID's bat management protective measures and would be protective of bat species within the project. Surveys of all known roosting structures would be conducted and the results presented at the annual consultation meeting. If bat use were determined to occur, humane exclusion devices would be installed at the correct time of year to prevent re-occupation by bats of project facilities, minimizing potential effects to special status bat species.

Wildlife Movement and Mortality

Project conduits and facilities such as open canals, elevated flumes, non-elevated or bench flumes, siphons, tunnels, penstocks can present barriers to wildlife movement and have the potential to result in entrapment or mortality of wildlife.

NID proposes to consult with California Fish and Wildlife and the Forest Service when replacing wildlife escape and wildlife crossing facilities (YB-TR4) and to monitor and record animal losses in project canals (YB-TR5). NID would consult with California Fish and Wildlife prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals. NID would assess wildlife escape facilities annually to ensure they are functional and in proper working order. NID staff would record animal losses in project canals including the following details: (1) location of the dead animal, (2) species, (3) date and time of observation, (4) suspected cause of death, (5) photograph, (6) estimated size, (7) estimated age, and (8) sex, if known. NID would provide this information to the California Fish and Wildlife and the Forest Service or BLM, as appropriate. Additionally, NID would develop measures to address any project-related increasing trends in mortality in consultation with appropriate agencies.

Forest Service condition 34 and BLM condition 18 specify consultation when replacing wildlife escape and crossing facilities, and are identical to NID's proposed consultation measures.

California Fish and Wildlife filed a 10(j) recommendation identical to NID's proposed consultation measures.

Forest Service condition 34 includes similar measures as NID's proposed measures to monitor animal mortalities in project canals; however, it also specifies NID to provide a report of recommendations for measures to decrease animal mortality for review and approval by appropriate agencies. BLM condition 17 is identical to NID's proposed measures to monitor animal mortalities in project canals.

California Fish and Wildlife filed a 10(j) recommendation similar to Forest Service condition 34.

Forest Service condition 34 specifies that NID shall maintain two existing crossing structures in the Bowman-Spaulling canal (canal mile 1.5 and 5.8) in a functional condition for wildlife use. The condition also specifies that NID construct and maintain one additional crossing (canal mile 3.5) in functional condition for wildlife use. These three structures would be identified as wildlife crossings maintained by NID and geo-referenced in a map provided to the Forest Service, BLM, and California Fish and Wildlife.

California Fish and Wildlife filed a 10(j) recommendation for wildlife crossing structures in Bowman-Spaulling canal is generally consistent with Forest Service condition 34, recommending that NID maintain one existing wildlife crossing structure in the Bowman-Spaulling canal (canal mile 5.8), and either construct one new crossing or retrofit the existing crossing at canal mile 1.5. For a new structure, California Fish and wildlife recommends that the wildlife crossing meet the minimum dimensions of 12-foot width, 8-foot-high side railings, and access ramps less than 30 percent grade, and undercrossings would meet the minimum dimensions of 10 feet high by 10 feet wide with natural substrate.

Our Analysis—Project conduits (open canals, elevated flumes, non-elevated or bench flumes, siphons, tunnels, and penstocks) and other project facilities can present barriers for wildlife present in the project boundaries. These barriers can disrupt the natural movement of wildlife species and lead to species entrapment and mortality. The Bowman-Spaulling canal bisects summer mule deer habitat (PG&E and NID, 2011h).

Wildlife passage points were found to be generally common throughout the Yuba-Bear Project, with penstocks and tunnels having the greatest opportunity of passage by the five target species. Generally, penstocks and tunnels are either completely buried or have passage opportunities

at intervals less than 0.5 mile apart throughout their entire length. However, some conduits contain segments that do not provide passage at least every 0.5 mile: Bowman-Spaulding conduit, Dutch Flat No. 2 conduit, and Chicago Park conduit. The greatest distance between passage opportunities on the project occurs on the Bowman-Spaulding conduit, where distances between crossing points are up to 1.19 miles.

The Yuba-Bear Project contains nine entrapment points. Types of wildlife escape points include: vehicle ramps; low-angle banks—natural or gunite; and low-angle banks—gunite with benches. At the Yuba-Bear Project, one wildlife mortality, an adult mountain lion, was reported in the Dutch Flat no. 2 conduit in 2009.

Bowman-Spaulding Canal

The Bowman-Spaulding canal consists of eight tunnels, nine excavated canals, one flume, and one inverted siphon. Passage points throughout the canal include wooden road bridges, paved road bridges, a steel grate road bridge, an open-grate footbridge, and one flume. Certain segments of the canal are characterized by slow- to moderate-velocity water and shallow water depth potentially allowing passage by all target species. The largest distance between passage points in the canal is 1.19 miles. No mortalities have been documented in the Bowman-Spaulding canal.

Due to the distance between passage points in the Bowman-Spaulding canal, Forest Service condition 34 specifying that NID maintain three specific crossing structures (two existing and one new structure) in the Bowman-Spaulding canal in a functional condition for wildlife would adequately protect target wildlife species that commonly cross this canal.

Consultation Prior to Replacing Wildlife Crossings

NID's proposed measure to consult with appropriate federal and state agencies prior to replacing wildlife crossing facilities is identical to Forest Service condition 34 and BLM condition 18. This measure is appropriate for the protection of wildlife movement because it would allow appropriate coordination between PG&E and agencies, and it ensures that if wildlife escape and crossing facilities become degraded and need replacement during the term of a new license, up-to-date standards would be applied to ensure the continued protection of target wildlife species.

Monitoring Animal Mortalities

NID's proposes to monitor animal losses in project canals. Forest Service condition 34 and BLM condition 10 contain additional protective measures specifying that NID provide a report of recommendations for measures to decrease animal mortality for review and approval by appropriate agencies. Monitoring would detect any changes in wildlife mortality and identify the need for protective measures. The agencies' additional measure would ensure that NID develop the appropriate protective measures to decrease animal mortality and protect wildlife movement activities within the project boundary.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

In consultation with FWS and NMFS, PG&E and NID developed a list of threatened and endangered species that potentially occur in the area of the projects. PG&E and NID used a three-step screening process to identify threatened and endangered species that could be affected by one or both of the projects. For various reasons, certain aquatic and plant species were eliminated from further analysis

(Table 3-206). Central Valley steelhead DPS, Stebbins' morning-glory, Layne's butterweed, California red-legged frog, and VELB potentially occur in the vicinity of the project.

Table 3-206. Threatened and endangered species eliminated from further analysis. (Source: staff)

Species Common Name	Species Latin Name	Status	Justification for Elimination from Further Analysis
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	Threatened	These species do not occur within the geographic scope of the projects.
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Threatened	
Delta smelt	<i>Hypomesus transpacificus</i>	Endangered	
Vernal pool fairy shrimp	<i>B. lynchi</i>	Endangered	Inland subspecies of cutthroat trout are endemic to the physiographic Lahontan basin of northern Nevada, eastern California, and southern Oregon; the threatened population segment of this species does not occur within the geographic scope of the projects.
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	Threatened	
Sacramento River winter-run chinook salmon evolutionarily significant unit (ESU)	<i>O. tshawytscha</i>	Endangered	
Central Valley spring-run chinook salmon ESU	<i>O. tshawytscha</i>	Threatened	This ESU is blocked by non-project facilities from river reaches within the geographic scope of the projects.
Southern DPS of North American green sturgeon	<i>Acipenser medirostris</i>	Threatened	Non-project dams prevent the migration of green sturgeon, and the critical habitat occurs outside of the geographic scope of the project. Therefore, the projects are not likely to affect green sturgeon and its critical habitat.
Pine Hill ceanothus	<i>Ceanothus roderickii</i>	Endangered	Suitable habitats for these species do not occur within either of the project areas; therefore, these species are unlikely to colonize the project areas.
Pine Hill flannelbush	<i>Fremontodendron decumbens</i>	Endangered	
El Dorado bedstraw	<i>Galium californicum</i> ssp. <i>sierrae</i>	Endangered	

Table 3-206. Threatened and endangered species eliminated from further analysis. (Source: staff)

Species Common Name	Species Latin Name	Status	Justification for Elimination from Further Analysis
Hartweg's golden sunburst	<i>Pseudobahia ahiifolia</i>	Endangered	
Sacramento orcutt grass	<i>Orcuttia viscida</i>	Endangered	Sacramento orcutt grass occurs only at elevations below the project boundaries; therefore, this species is unlikely to colonize the project areas.

Central Valley Steelhead DPS

The Central Valley steelhead DPS (*O. mykiss irideus*) is listed as threatened under the ESA. Critical habitat was designated in September 2005. On August 15, 2011, NMFS completed its 5-year review of Central Valley steelhead and concluded this species should remain listed as threatened. In its final listing, NMFS concluded that the threatened Central Valley steelhead DPS includes all naturally spawned populations of steelhead (and their progeny) below natural and manmade barriers in the Sacramento and San Joaquin Rivers and their tributaries. Critical habitat for Central Valley steelhead within the geographic scope¹² of the Drum-Spaulding Project includes Auburn Ravine from RM 0 to RM 26.6. Primary constituent elements (a physical or biological feature essential to the conservation of a species on which its designated critical habitat is based) in Auburn Ravine include habitat for adult and juvenile migration, spawning and incubation, and juvenile rearing.

North American Wolverine

On February 4, 2013, FWS proposed the DPS of the North American wolverine (*Gulo gulo luscus*) occurring in the contiguous United States for listing as a threatened species under the ESA. Currently, the North American wolverine appears to be distributed as functioning populations in two regions in the contiguous United States: the North Cascades in Washington; and the northern Rocky Mountains in Idaho, Montana, and Wyoming. The California wolverine (*Gulo gulo luteus*) is currently listed as threatened under the California Endangered Species Act and is a California fully protected species.

One occurrence of the wolverine was reported in 1971 at the Yuba-Bear Project along the southern edge of Jackson Meadows reservoir; this occurrence is considered to be unverified by the Tahoe National Forest (PG&E, 2011a and NID, 2011a). In 2008, a male wolverine was confirmed to be present in the Tahoe National Forest (Moriarty et al., 2009, as cited in California Fish and Wildlife, 2012). Camera detections have confirmed the presence of wolverine in 2008 through 2012, with locations within one mile of the following project reservoirs: Fordyce, Sterling, Jackson Meadows, and White Rock Lake (California Fish and Wildlife, 2012b and 2012c). Genetic testing revealed that the wolverine observed in

¹² Although the geographic extent of cumulative effects in Auburn Ravine was not specifically addressed in the second scoping document (FERC 2008), FERC's February 23, 2009, *Study Plan Determination for the Yuba-Bear, Drum-Spaulding, and Rollins Projects* concurred with PG&E that flows in Auburn Ravine below PCWA's Auburn Tunnel are cumulatively affected by the operations of multiple entities and did not require flow and habitat studies in that stream reach.

2008 was not a descendant of the endemic Sierra Nevada wolverine population, but was likely derived from wolverines in the Rocky Mountains (Moriarty et al., 2009). There is no evidence that California currently hosts a wolverine population or that female wolverines have made, or are likely to make, similar dispersal movements (FWS, 2013).

Wolverines are dependent on deep persistent snow cover for successful denning, and they concentrate their year-round activities in areas that maintain deep snow into spring and cool temperatures throughout summer. In the southern part of their range, such as in California, they are restricted to high elevations. They primarily scavenge carrion, but also prey on small animals and birds and eat fruits, berries, and insects. Wolverine habitat is predicted to occur at elevations over 4,300 feet msl throughout the project areas.

The California wolverine (*G. g. luteus*), considered to be extirpated from California, historically occupied a range in California encompassing an area from Mount Shasta south to Monache Meadows in Tulare County and including portions of the north coast and the northern Sierra Nevada regions of the state. Wolverine habitat is predicted to occur at elevations over 4,300 feet msl throughout the project areas.

Stebbins' Morning-glory

Stebbins' morning-glory (*Calystegia stebbinsii*) is listed as endangered under the ESA. No critical habitat is designated for this species. FWS has issued a recovery plan for gabbro soil plants of the central Sierra Nevada foothills, including Stebbins' morning-glory.

Stebbins' morning-glory is a leafy herbaceous perennial found on gabbro or serpentine soils in chaparral or cismontane woodland habitats at elevations between 607 and 2,394 feet msl; this species has a flowering period ranging from April to July. Appropriate habitat for this species occurs at the Drum-Spaulding Project near Drum powerhouse and along Drum Powerhouse Road, and at the Yuba-Bear Project along the Dutch Flat no. 2 conduit. Therefore, this species could potentially colonize both project areas in the future. Occurrences in the vicinity of the projects (outside the project boundaries) have been documented in Shingle Springs, Coloma, Pilot Hill, Grass Valley, and Lake Combie, but surveys did not locate any individuals within the project boundary (PG&E and NID, 2011b).

Layne's Butterweed

Layne's butterweed (*Senecio layneae*) is listed as threatened under the ESA. No critical habitat is designated for this species. FWS's recovery plan for gabbro soil plants of the central Sierra Nevada foothills includes Layne's butterweed.

Layne's butterweed is found in open rocky areas within chaparral plant serpentine soils in chaparral and cismontane woodland at elevations between 656 and 3,280 feet msl; this species has a flowering period ranging from April to August. Appropriate habitat occurs at the Drum-Spaulding Project primarily near Drum powerhouse and along Drum Powerhouse Road. This species could potentially colonize the Drum-Spaulding Project area in the future. Occurrences in the vicinity of the projects (outside the project boundaries) have been documented in Shingle Springs, Clarksville, Coloma, and Pilot Hill, but surveys did not locate any individuals within the project boundary (PG&E and NID, 2011b).

California Red-legged Frog

The California red-legged frog (*Rana draytonii*) is listed as threatened under the ESA. Critical habitat was designated on March 2010. No known California red-legged frog populations and no critical habitat for this species are known to occur in the immediate vicinity of the project areas.

California red-legged frog breeding occurs from late November to late April in ponds, backwater pools, and creeks. Egg masses attach to emergent vegetation such as cattails and bulrushes. Outside of the breeding season, adult California red-legged frog individuals can be found foraging and seeking shelter upstream, downstream, or upslope from breeding habitats. Individuals are usually found in perennial ponds or pools and perennial or seasonal streams where water remains for a minimum of 20 weeks beginning in the spring and there is dense emergent or shoreline riparian vegetation. Long-distance dispersal of California red-legged frog can occur up to 1 mile from suitable habitats.

To determine the presence of California red-legged frog, PG&E and NID conducted habitat assessments and record reviews at all reservoirs and impoundments below 5,000 feet msl associated with the projects and at 165 aquatic habitat sites within 1 mile of these facilities (table 3-207). No California red-legged frog individuals were observed during the site assessments or during any other relicensing studies from 2007 through 2010, although the applicants identified aquatic habitats potentially suitable for this species. The site assessment surveys determined that 119 sites had or were presumed to have the essential components of California red-legged frog breeding habitat. Records reviews revealed that one historical California red-legged frog record occurred in the vicinity of the Drum-Spaulding Project, 1 mile from Wise forebay, and one historical record was in the vicinity of the Yuba-Bear Project, less than 1 mile from Dutch Flat afterbay and Dutch Flat no. 2 forebay (PG&E and NID, 2010). Suitable habitat is not currently evident at the location of either of these historical records, and there are no known existing California red-legged frog populations in either project area.

Table 3-207. Summary of Project Sites Assessed for California Red-Legged Frog Habitat. (Source: PG&E and NID, 2010)

Project Site	Land Ownership	Essential Components of California Red-legged Frog Breeding Habitat Present
Dutch Flat Forebay	NID	Yes
Dutch Flat Afterbay	NID, PG&E, BLM, Private	Yes
Little York Basin	NID	Yes
Chicago Park Forebay	BLM	Yes
Rollins Reservoir	PG&E, NID, BLM, Private	No
Lake Spaulding	PG&E, USFS	No
Deer Creek Forebay	PG&E	Yes
Drum Forebay	PG&E	No
Drum Afterbay	PG&E	Yes
Halsey Forebay	PG&E	No
Halsey Afterbay	PG&E	Yes

Table 3-207. Summary of Project Sites Assessed for California Red-Legged Frog Habitat. (Source: PG&E and NID, 2010)

Project Site	Land Ownership	Essential Components of California Red-legged Frog Breeding Habitat Present
Rock Creek Reservoir	PG&E	Yes
Wise Forebay	PG&E	No
Rollins Transmission Line	Private	N/A

VELB

VELB (*Desmocerus californicus dimorphus*) is listed as threatened under the ESA. Designated critical habitat for VELB includes the American River Parkway and Sacramento Zones. FWS issued a recovery plan for VELB in August 1984. On February 14, 2007, FWS completed a 5-year review of VELB and recommended that the species be de-listed. On August 19, 2011, FWS issued a 90-day review notice regarding potential de-listing of VELB. On October 2, 2012, FWS proposed to remove VELB and its designated critical habitat from the List of Endangered and Threatened Wildlife.

VELB has a life cycle of 1 to 2 years, and it spends most of its life cycle in the larval stage. Eggs are laid on elderberry leaves or bark and hatch within 2 days; the emergent larvae live within the stems of the plants for 1 to 2 years. Adults emerge from late March through June from the stems through holes made by larvae prior to pupation and are short-lived. Under FWS conservation guidelines for the VELB, elderberry plants with stems that are 1.0 inch in diameter or larger, which are on or adjacent to project sites, must be thoroughly inspected for beetle exit holes to evaluate potential impacts to VELB habitat.

The Yuba-Bear and Drum-Spaulding Projects' facilities are outside of the critical habitat zones designated by FWS for VELB, but portions of each project fall within the potential range of the beetle. In 2009 and 2011, PG&E and NID conducted studies to determine the presence and distribution of the VELB and identify locations of potential VELB habitat, which extends up to 3,000 feet msl. Surveys were carried out by qualified botanists on foot and by boat, beginning at lower elevations and progressing to higher elevations. All elderberry plants that met VELB habitat requirements of a minimum stem diameter of 1.0 inch were surveyed. A total of 26 occurrences of elderberry plants were located within the Drum-Spaulding Project boundary (table 3-208). VELB indicators (boreholes) were observed at three locations, each along Bear River canal. No elderberry plants, VELB, or critical habitat were found in the Yuba-Bear Project area. NID is unaware of any historic records of VELB within the project boundary (PG&E and NID, 2011c).

Table 3-208. Elderberry Plant Occurrences Within The Drum-Spaulding Project Boundary.
(Source: PG&E and NID, 2011)

Number	Elderberry Occurrence and Location	Site Description ^a
1	Located at the base of Mormon Ravine near the shore of Folsom Lake.	Three individuals on the north side of Mormon Ravine, cross footbridge and 20 feet northeast of rock outcrop.
2	Bear River canal about 0.20 mile upstream from the Halsey forebay.	One individual on northwest side of levee and immediately south of private driveway in willow and blackberry thicket.
3	Unnamed drainage between Wooley Creek and Bear River canal. This drainage intercepts the Bear River canal at about 1.06 miles upstream of Halsey forebay; the occurrence is 0.49 mile from the Bear River canal.	Two individuals on north side of Cole road and south of Madrone lane on the east side of Wooley Creek.
4	Unnamed drainage between Wooley Creek and Bear River canal. This drainage intercepts the Bear River canal at about 1.06 miles upstream of Halsey forebay; the occurrence is 0.77 mile from the Bear River canal.	One individual at the junction of Wooley Creek and Meadow Vista road on southeast side of Meadow Vista road, surrounded by a mesh cage.
5	Unnamed drainage between Wooley Creek and Bear River canal. This drainage intercepts the Bear River canal at about 1.06 miles upstream of Halsey forebay; the occurrence is 0.98 mile from the Bear River canal.	10–20 individuals and many young recruits (too small to classify) in a 1,200-square-foot area on the west side of Wooly Creek and just south of Meadow lane crossing.
6	Bear River canal about 3.05 miles upstream from the Halsey forebay.	One individual on the west side of Bear River canal and about 1,500 feet south of Meadow Gate road.
7	Bear River canal about 4 miles upstream from the Halsey forebay.	Large individual with several stems equal to or greater than 5 inches in diameter right along the Bear River canal. There were multiple large stems that had splintered and collapsed, which appeared recent, and evidence of old trimming on two stems 1-3 inches in diameter. Fourteen boreholes found.
8	Near Bear River canal, about 3.86 miles upstream from the Halsey forebay.	One individual on south side of Bear River canal access road, adjacent to horse corral.
9	Bear River canal about 5.37 miles upstream from the Halsey forebay.	Small group of individuals between canal and roadway.
10	Bear River canal about 5.45 miles upstream from the Halsey forebay.	About 10 individuals on the northwestern side of Bear River canal.

Table 3-208. Elderberry Plant Occurrences Within The Drum-Spaulding Project Boundary.
(Source: PG&E and NID, 2011)

Number	Elderberry Occurrence and Location	Site Description^a
11	Bear River canal about 5.5 miles upstream from the Halsey forebay, between occurrences 9 and 10.	One individual, 3-5 inches in diameter, on far bank of the Bear River canal, downslope of a road on private land.
12	Bear River canal about 63 feet upstream and across the canal. Between occurrences 9 and 10 on the other side of the canal.	One individual, 1-3 inches in diameter, on far bank of the Bear River canal, downslope of a road on private land.
13	Bear River canal about 48 feet and across the canal from marker "905+00."	One individual, 1-3 inches in diameter, on far bank of the Bear River canal, downslope of a road on private land.
14	Bear River canal about 108 feet and across the canal from marker "905+00."	One individual, 1-3 inches in diameter, on far bank of the Bear River canal, downslope of a road on private land.
15	Bear River canal about 5.67 miles upstream from the Halsey forebay.	One large individual on the north side of Bear River canal between the canal and houses.
16	Bear River canal about 5.75 miles upstream from the Halsey forebay.	One individual downslope from the canal.
17	Bear River canal about 6.01 miles upstream from the Halsey forebay.	Group of smaller individuals 20 feet from the west side of canal.
18	Bear River canal about 6.13 miles upstream from the Halsey forebay.	Small group of individuals 10 feet from and on the east side of the canal.
19	Bear River canal about 6.14 miles upstream from the Halsey forebay.	Several individuals 5 feet from and on the east side of the canal. Ten boreholes found.
20	Bear River canal about 6.28 miles upstream from the Halsey forebay.	A few individuals about 30 feet from and on the south side of the canal.
21	Bear River canal about 6.33 miles upstream from the Halsey forebay.	Small group of individuals located 10 feet from and on the south side of the canal.
22	Located on access road between Hill Road and Bear River canal; the access road intercepts the Bear River canal about 6.92 miles upstream of the Halsey forebay; the occurrence on the access road is about 0.08 mile away from Bear River canal.	One large individual located on the south side of Country road and just east of bridge. Three boreholes found.
23	Located on access road which intercepts the Bear River canal about 6.85 miles upstream from the Halsey forebay; occurrence is 0.01 mile from the Bear River canal.	Large stand of individuals on southeast side of Country road and in all class sizes.

Table 3-208. Elderberry Plant Occurrences Within The Drum-Spaulding Project Boundary.
(Source: PG&E and NID, 2011)

Number	Elderberry Occurrence and Location	Site Description ^a
24	Located near access road which intercepts the Bear River canal about 6.87 miles upstream from the Halsey forebay; occurrence is 0.01 mile from the Bear River canal.	Several individuals growing near seep on the north side of Country road, which connects Hill road with the Bear River canal.
25	Located near access road which intercepts the Bear River canal about 14.30 miles upstream from the Halsey forebay; occurrence is 0.06 miles from the Bear River canal.	About 15 individuals and small young recruits near canal access road and within blackberry thickets.
26	Near Bear River canal about 14.55 miles upstream of the Halsey forebay, and 0.01 mile away from the Bear River canal.	One individual and small young recruits upslope of canal access road, connecting Plumtree road with the Bear River canal.

^a Numbers of individual elderberry shrubs is often ambiguous due to regeneration of elderberry plants within existing plants.

3.3.4.2 Environmental Effects

3.3.4.2.1 Drum-Spaulding Project

General Protection Measures

PG&E proposes to consult annually with the Forest Service, BLM, and Reclamation (DS-GEN1) and to conduct annual employee training (DS-GEN2) on special status species. PG&E would train its operations staff annually to familiarize them with special status species and sensitive areas within the project boundary. PG&E would direct staff to avoid disturbance of special status species.

PG&E's proposed measures to annually consult with appropriate agencies and perform annual employee training are consistent with Forest Service condition 1 for annual consultation and condition 28 for annual employee training; BLM condition 1 for annual employee training and condition 23 for annual consultation; and California Fish and Wildlife 10(j) recommendation 1 for annual employee training and 10(j) recommendation 1 for annual consultation.

Forest Service condition 34 and BLM condition 14 specify that PG&E, beginning in the first full calendar year, annually review current lists of special status species that might occur in the project area and that may be affected by project O&M activities. If a species were added to the list, PG&E in consultation with the Forest Service, BLM, and California Fish and Wildlife would determine if the species or suitable habitat is likely to occur on project lands. If a special status species were likely to occur on project lands, then PG&E, in consultation with the Forest Service, BLM, and California Fish and Wildlife, would develop and implement a study plan to assess the effects of O&M activities on the special status species. Additionally, if special status species are detected prior to or during construction or O&M activities, PG&E would immediately notify appropriate agencies. If it is determined that activities would adversely affect the species, then PG&E would develop appropriate protective measures. If federally or state listed

or proposed threatened or endangered species are detected prior to or during construction, PG&E would immediately notify appropriate agencies.

Forest Service conditions 12 and 34 and BLM conditions 13 and 33 are identical and specify that PG&E submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation would evaluate the potential effects of proposed action on special status species or its habitat, and would include components such as (1) avoidance or minimization of adverse effects to special status species; (2) compliance of project-related activities to protective measures in management plans for special status species; and (3) development of implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species. If necessary, the Forest Service or BLM may require mitigation techniques.

California Fish and Wildlife submitted 10(j) recommendations similar to Forest Service and BLM conditions recommending an annual review of special status species lists and the submittal of a biological evaluation prior to construction activities that may disturb special status species or critical habitat.

PG&E agrees with the Forest Service conditions 12 and 34 and BLM condition 33, but PG&E's alternative condition 13 to BLM would delete BLM's condition 13 to reduce redundancy with condition 33. PG&E's alternative would include a biological evaluation for agency review prior to conducting project activities affecting special status species.

Our Analysis—PG&E's proposals to consult annually with the Forest Service, BLM, and Reclamation and to conduct annual employee training, in addition to PG&E's acceptance of Forest Service condition 34 and BLM condition 14 to annually review lists of special status species, as described above, would provide protection to special status species within the project boundary.

Before construction of any project features not addressed in this EIS, PG&E would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special status species would be developed, if appropriate, as part of the license amendment proceeding. Forest Service conditions 12 and 34 and BLM conditions 13 and 33 are repetitive of the license amendment process for construction activities not addressed in this EIS.

Central Valley Steelhead DPS

The Central Valley steelhead spawning run in Auburn Ravine occurs downstream of Auburn Ravine 1 diversion dam and generally between December and April after the irrigation and peak consumptive water delivery season. Spawning within the streams around Auburn Ravine usually occurs from late January through March. Fry emerge about 4 to 6 weeks after spawning, typically from late March to May. Juveniles can remain in freshwater for 1 to 3 years before migrating to the ocean to grow and mature; however, within the lower elevation streams of the Central Valley most steelhead spend just 1 year in the natal stream, with emigration typically occurring by spring the year following emergence between January and May, but occasionally as early as October. Fry rearing in Auburn Ravine occurs year round from emergence until emigration the following spring.

Our Analysis

Although designated steelhead critical habitat in Auburn Ravine extends upstream to Ophir cataract at RM 26.6, it is unlikely that steelhead occupy the 2.8 mile reach downstream to the non-project Auburn diversion dam 1 at RM 23.8. The available information suggests that the 11-foot-high Auburn Ravine 1 diversion dam is a barrier to upstream-migrating adult steelhead, during all but the most infrequent hydrological conditions (PG&E 2010, 2012a). There are no confirmed occurrences of anadromous fish in Auburn Ravine upstream of Auburn Ravine 1 diversion dam (PG&E,

2010). Reports of steelhead adults and juveniles as far up Auburn Ravine as the Wise powerhouses are unconfirmed, as the observed rainbow trout were not confirmed to be steelhead rather than resident rainbow trout (Technical Memorandum 3-13, *Western Placer County Streams*). In a survey of upstream passage and fish screen opportunities at diversion dams on Auburn Ravine, Bailey and Buell (2005) report that the Auburn Ravine 1 diversion dam is a formidable, and conceivably, perennial barrier to upstream migration except at extreme high streamflows, which would inundate the dam (flows at which the water surface elevation upstream and downstream of the dam converge).

PG&E reports that during the irrigation season (April to November) combined flows of 200 to 250 cfs are not uncommon at Auburn Ravine 1 diversion dam and do not approach inundation conditions. The flows necessary to inundate Auburn Ravine 1 diversion dam have not been documented; however, available data indicate that such flows are rare and are substantially greater than the flows available when adult steelhead would be present. Based on available hydrologic information for Auburn Ravine, estimated high unregulated flows in excess of 200 cfs occur occasionally during the winter period. Estimates of unregulated streamflow for the 12 water years from 1998 to 2009 indicate that natural unregulated streamflows would have exceeded 200 cfs on only 14 days. During that period flows would have exceeded 400 cfs only twice with a maximum of 570 cfs; it is unknown if these two flow events caused inundation of the Auburn Ravine 1 diversion dam. Typical flows from hydroelectric spill releases (about 40 to 80 cfs) during the winter and spring (November to mid-April) are considerably less. The likelihood of flows necessary to inundate Auburn Ravine 1 diversion dam at a time when adult steelhead would be present is extremely low, making this 2.8 mile reach of Auburn Ravine essentially inaccessible and unoccupied by steelhead.

Direct effects of PG&E project operations in Auburn Ravine extend from the South canal release point at RM 27.5, to about 1.2 miles downstream to the Auburn tunnel at RM 26.4. Thus, the project directly affects flows in about 0.2 mile of designated critical habitat for steelhead in Auburn Ravine between Ophir cataract and Auburn Tunnel. Downstream of Auburn Tunnel and Auburn 1 diversion dam, streamflows and designated critical habitat are cumulatively effected by project and multiple non-project operations (section 3.3.2, *Cumulative Effects*).

Typical project operations result in flows that are similar to or higher than unregulated conditions and have little if any effect on designated critical habitat for steelhead in Auburn Ravine. Except during canal outages, project and non-project releases from South canal maintain streamflows that are typically higher than natural unregulated flows, which support designated critical habitat for steelhead in lower Auburn Ravine. During canal outages (typically scheduled between mid-October and mid-November following the irrigation season) flows in Auburn Ravine below PG&E's South canal release point and Auburn Tunnel are relatively low and reflect the unregulated natural flow for the period. Planned outages for annual maintenance are typically completed by late November, after which Wise and Wise No. 2 powerhouses begin operation and releases from South Canal augment Auburn Ravine streamflows through winter and spring.

Releases from South canal during operations of Wise and Wise no. 2 powerhouses in late-fall and winter generally increase the frequency and duration of high flow events. However, the magnitude and timing of these releases from South canal are in the same range as natural unregulated runoff events in this watershed (figures 3.5-19 and 3.5-20 from technical memorandum 3-13, *Western Placer County Streams*). Because the magnitude and timing of releases from South canal are in the same range as natural unregulated runoff events in this watershed, the potential direct effects of project operations on designated critical habitat upstream of Auburn Tunnel (RM 26.4 to RM 26.6) are minimal.

Releases from South canal between mid-April and mid-October are made primarily to meet non-project consumptive demands (50 to 170 cfs) for irrigation downstream of Auburn Tunnel. During this

period, these releases would occur regardless of operations at Wise and Wise no. 2 powerhouses. Flow releases to Auburn Ravine at South canal during the consumptive water delivery period typically increase through the summer and are higher than natural unregulated flows. During late spring, PG&E's releases from South canal to meet consumptive water deliveries maintain streamflows that are significantly higher than unregulated natural flows in the 0.2 miles of Auburn Ravine with designated critical habitat for steelhead.

North American Wolverine

Camera detections have confirmed the presence of wolverines within one mile of three reservoirs in the Drum-Spaulding Project—Fordyce, Sterling, and White Rock Lake.

FWS filed a 10(a) recommendation recommending that PG&E develop a wolverine and Pacific fisher management plan to protect these species within carnivore management areas, and that PG&E prevent the use of second-generation anticoagulants within the project area.

Our Analysis—California wolverine could be affected by the proposed project, including O&M activities such as hazard tree removal or brush pile removal during maintenance of fire breaks along roadsides, canals, transmission lines, and recreation facilities. Campgrounds associated with the project are unlikely to have an effect on any of this species since the campgrounds are restricted in area and period of use and are probably avoided by this species; however, dispersed recreation activities such as camping, hiking, and OHV use may overlap with suitable habitat for the wolverine. Wolverines are sensitive to human disturbance and will avoid areas with high human presence.

Measures previously discussed under *Wildlife Movement and Mortality* would benefit wolverines by improving movement through the project area.

There are no wolverine designated carnivore management areas within the project boundary. The development of wolverine management plan, as recommended by FWS, would add limited protection to the species due to its lack of use of the available habitat within the project boundary.

PG&E is bound by federal, state, and local laws pertaining to the use of rodenticides as part of O&M activities. These products, if legally registered for use within the State of California and used as directed on the product labels, are suitable for use.

PG&E's proposals to consult annually with the Forest Service, BLM, and Reclamation and to conduct annual employee training, as previously discussed under *General Protection Measures*, would help protect the wolverine.

Given that this species is not found within the project boundary and absence of evidence that California currently hosts a wolverine population, the project would have no effects on the wolverine.

Stebbins' Morning-glory and Layne's Butterweed

Stebbins' morning-glory has the potential to colonize the project area based on suitable and available habitat. Stebbins' morning-glory occurs primarily on gabbro soils in the Pine Hill formation and appropriate habitat occurs in the project area.

Layne's butterweed has the potential to colonize the project area based on suitable and available habitat. It occurs primarily on gabbro soils in El Dorado County, including the Pine Hill formation, and appropriate habitat occurs in the project area.

Our Analysis

Although these species have not been observed in the project areas, potential habitat has been found at various locations, as described above. If these species were to colonize suitable habitats in the future, potential effects could result from O&M activities that currently take place as part of normal project operations including routine ground-disturbing activities and vegetation management activities such as mechanical clearing and herbicide use. Negative effects on threatened and endangered species associated with proposed recreation facility enhancements (e.g., road widening, parking lot expansions, campground expansion) and increased recreation use are not expected; however, may occur if these plants colonize these areas. Conversely, positive effects on these species are possible if OHV use, camping, and hiking activities in unauthorized areas are reduced by the recreation proposals contained within the final license application.

PG&E's Integrated Vegetation Management Plan includes a component to protect special status species, which would decrease future effects to special status plants through the protection of sensitive vegetation resources within the project boundary. It also provides for the training of employees and an annual consultation meeting that would help protect listed plant species.

Given that these species are not found within the project boundary and with these procedures in place, the project is not likely to adversely affect Stebbins' morning-glory or Layne's butterweed.

California Red-legged Frog

The nearest California red-legged frog population and critical habitat is about 4.6 miles from the Drum-Spaulding Project and is unaffected by the project. No observations of California red-legged frog were documented within the project area. Essential components of California red-legged frog breeding habitat were present at four project facilities (Deer Creek forebay, Drum afterbay, Halsey afterbay, and Rock Creek reservoir), but the habitat has marginal quality because of the presence of predatory fish and American bullfrog. Parts of three stream reaches affected by the Drum-Spaulding Project (Bear River reach #2, Halsey afterbay dam reach, and Rock Creek reservoir dam reach) may also contain suitable habitats. None of these sites is within 1 mile of a historical or known occurrence of California red-legged frog.

Our Analysis

There is a low probability that California red-legged frog occurs at any facility in the Drum-Spaulding Project, where potential habitat is either absent, of marginal quality, or at non-project sites. However, the presence of the species cannot be disproved without extensive surveys throughout the area, most of which is on private property.

Project sites exhibiting essential components of California red-legged frog breeding habitat, including Deer Creek forebay, Drum afterbay, Halsey afterbay, and Rock Creek reservoir, were characterized as small water bodies with emergent vegetation or dense, overhanging shrubs at the margins. If red-legged frogs were found at these sites, they could be affected by short-term changes in water level, and annual maintenance. However, Deer Creek forebay (brown trout), Drum afterbay, Halsey afterbay (brown trout and green sunfish), and Rock Creek reservoir also contain known introduced predatory fish that diminish suitability for California red-legged frog.

Most stream reaches potentially affected by the project do not provide breeding habitat. Larger rivers are characterized by strong currents and do not support backwater areas or suitable vegetation for egg attachment or cover. Smaller streams are mostly too shallow and higher gradient; where sufficiently deep pools exist, suitable emergent or margin vegetation is absent. Three reaches do provide pools or

backwaters with suitable emergent or margin vegetation. In Bear River reach no. 2, low water temperatures and abundant fish may limit suitability for California red-legged frog. In Halsey afterbay dam reach and Rock Creek dam reach, the presence of predators (centrarchid fish and American bullfrog) and surrounding suburban development may decrease the suitability and quality of potential habitat for the California red-legged frog.

PG&E's proposals to consult annually with the Forest Service, BLM, and Reclamation and to conduct annual employee training, as previously discussed under *General Protection Measures*, would help protect the red-legged frog.

Given the low probability of occurrence of this species and marginal habitat, and with these procedures in place, the project is not likely to adversely affect the California red-legged frog.

VELB

Future project-related maintenance activities at the Drum-Spaulding Project could result in the clearing of elderberry and negatively affect VELB.

PG&E initiated consultation in 2001 with the Forest Service, FWS, and BLM regarding the potential effects to VELB associated with Drum-Spaulding's transmission line separation project. In 2003, a final Memorandum of Understanding was executed between PG&E, Forest Service, FWS, and BLM, defining the roles of each party in the consultation and implementation of a Programmatic Biological Opinion (PBO - USFWS file 1-1-01-F-0014). The Programmatic Biological Opinion was approved in 2003 and covers the effects of PG&E's routine O&M activities within the potential range of the VELB. The Programmatic Biological Opinion forms the basis for PG&E's VELB Conservation Program. It was developed to ensure that PG&E's facilities and operations, including the Drum-Spaulding Project, are in compliance with the ESA and that PG&E's actions proactively work to support VELB recovery. The PG&E VELB Conservation Program, as articulated in the Programmatic Biological Opinion, includes transmission lines associated with FERC-licensed projects owned and operated by PG&E, as well as various PG&E linear facilities associated with hydroelectric generation projects such as, canals, penstocks, dams, weirs, flumes, culverts, powerhouses, and associated roads. The PG&E VELB Conservation Program addresses potential effects of the project by providing avoidance and minimization measures. PG&E proposes as a VELB management measure to comply with the Programmatic Biological Opinion.

PG&E also proposes to implement the Integrated Vegetation Management Plan, which contains guidance for internal coordination of programmatic protections for VELB and VELB habitat (DS-TR1).

Our Analysis

As discussed above, PG&E has identified elderberry at 26 locations within the Drum-Spaulding Project area (table 3-208). PG&E routinely conducts O&M activities in the vicinity of 18 of these locations. The primary O&M activity with the potential to affect elderberry is vegetation management to ensure safe employee access to and structural integrity of water conveyance and storage and related facilities (i.e., buildings, communications structures, etc.) associated with hydroelectric generation projects. Canal maintenance and road maintenance activities also have the potential to affect elderberry. In some locations, PG&E has observed evidence of trimming of the upper branches of elderberry, likely the result of public use of the area. "Do Not Cut" tapes have been attached to elderberry occurrences where PG&E O&M activities generally take place. Project staff are aware of the elderberry existence and avoid the plants during O&M activities

The guidance in PG&E's Integrated Vegetation Management Plan for internal coordination of programmatic protections for VELB and VELB habitat would ensure adherence to previously developed guidance and protect or minimize VELB habitat from future construction and O&M activities. PG&E's proposals to consult annually with the Forest Service, BLM, and Reclamation and to conduct annual employee training, in addition to PG&E's acceptance of Forest Service condition 34 and BLM condition 14 to annually review lists of special status species would provide protection to special status species within the project boundary. Although these procedures would result in the avoidance or minimization of impacts, adverse impacts to the VELB may still result during the next license term. Any effects to elderberry shrubs during the term of the license, which is expected to be limited, would be offset by that habitat acquired or developed under the conservation program. Training of maintenance workers and implementation of minimization and avoidance would reduce the likelihood of potential incidental take of the VELB.

3.3.4.2.2 Yuba-Bear Project

General Protection Measures

NID proposes to meet annually with the Forest Service and BLM to review pertinent special status species lists (YB-GEN3). NID would review any species on the Forest Service sensitive species list, the Tahoe National Forest watch list, or the BLM list that might occur on any land within the project area and that may be affected by project operations. If a species is listed, NID would determine if the species or suitable habitat is likely to occur on project land. NID would then coordinate with the appropriate agencies to assess and minimize the effects of project activities on the species. NID also proposes to consult with the Forest Service and BLM on potential effects of new facilities on special status species on federal land (YB-GEN5).

BLM condition 21 specifies that NID annually review lists of special status species. Forest Service condition 34 is similar to BLM condition 21, specifying that NID annually review lists of special status species; however, it includes additional protective measures. The Forest Service condition adds rare, threatened, and endangered species to the list of species to be reviewed and includes details regarding notification and distribution of reports resulting from the annual review.

Forest Service conditions 12 and 34 and BLM conditions 20 and 52 are identical and specify that NID submit a biological evaluation for approval prior to any construction projects on project lands that may affect special status species or critical habitat. The biological evaluation would assess potential effects of proposed action on a special status species or its habitat, and would include components such as (1) avoidance or minimization of adverse effects to special status species; (2) compliance of project-related activities to protective measures in management plans for special status species; and (3) development of implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species. If necessary, the Forest Service or BLM may require mitigation techniques.

California Fish and Wildlife submitted 10(j) recommendations similar to the Forest Service conditions recommending an annual review of special status species lists and the submittal of a biological evaluation prior to construction activities that may disturb special status species or critical habitat.

Our Analysis—An annual review of special status species and their potential to be present within the habitats contained within the project boundary, as specified in Forest Service condition 34 and BLM condition 21, would be protective of the resource, if present. NID's Vegetation Management Plan provides guidance on protecting sensitive areas, including areas with known special status species resources. The implementation of additional requirements in Forest Service condition 34 (review of listed threatened or endangered plant species and notification and distribution of reports resulting from the annual review) would be appropriate and protective of this resource.

Before construction of any project features not addressed in this EIS, NID would first need to file a license amendment with the Commission. At that time, a biological evaluation for the protection of special-status species would be developed, if appropriate, as part of the license amendment proceeding. NID's proposal to consult with federal agencies prior to construction activities in federal land, Forest Service conditions 12 and 34, and BLM conditions 20 and 52 are repetitive of the license amendment process for construction activities not addressed in this EIS.

North American Wolverine

Camera detections have confirmed the presence of wolverines within 1 mile of Jackson Meadows reservoir.

FWS filed a 10(a) recommendation recommending that NID develop a wolverine and Pacific fisher management plan to protect these species within carnivore management areas, and that NID prevent the use of second-generation anticoagulants within the project area.

Our Analysis—The wolverine could be affected by the proposed project, including O&M activities such as hazard tree removal or brush pile removal during maintenance of fire breaks along roadsides, canals, transmission lines, and recreation facilities. Campgrounds associated with the project are unlikely to have an effect on any of this species since the campgrounds are restricted in area and period of use and are probably avoided by this species; however, dispersed recreation activities such as camping, hiking, and OHV use may overlap with suitable habitat for the wolverine. Wolverines are sensitive to human disturbance and will avoid areas with high human presence.

Measures previously discussed under *Wildlife Movement and Mortality* would benefit wolverines by improving movement through the project area.

There are no wolverine designated carnivore management areas within the project boundary. The development of wolverine management plan, as recommended by FWS, would add limited protection to the species due to its lack of use of the available habitat within the project boundary.

NID is bound by federal, state, and local laws pertaining to the use of rodenticides as part of O&M activities. These products, if legally registered for use within the State of California and used as directed on the product labels, are suitable for use.

NID's proposals to meet annually with the Forest Service and BLM to review pertinent special status species lists and to consult with the Forest Service and BLM on potential effects of new facilities on special status species on federal land, as previously discussed in the *General Protection Measures* section, would help protect the wolverine.

Given that this species is not found within the project boundary and absence of evidence that California currently hosts a wolverine population, the project would have no effects on the wolverine.

Stebbins' Morning-glory

Stebbins' morning-glory has the potential to colonize the project area based on suitable and available habitat. Stebbins' morning-glory occurs primarily on gabbro soils in the Pine Hill formation and appropriate habitat occurs in the project area.

Our Analysis

Although this species has not been observed in the project area, potential habitat has been found at various locations, as described above. If this species were to colonize suitable habitats in the future, potential effects could result from O&M activities that currently take place as part of normal project operations including routine ground-disturbing activities and vegetation management activities such as mechanical clearing and herbicide use. Negative effects on threatened and endangered species associated with proposed recreation facility enhancements (e.g., road widening, parking lot expansions, campground expansion) and increased recreation use are not expected; however, may occur if this resource colonizes these areas. Conversely, positive effects on threatened and endangered species are possible if off road vehicle use, camping, and hiking activities in unauthorized areas is reduced by the recreation proposals contained within the final license application.

NID's proposals to meet annually with the Forest Service and BLM to review pertinent special status species lists and to consult with the Forest Service and BLM on potential effects of new facilities on special status species on federal land, as previously discussed in the *General Protection Measures* section, would help protect listed plant species.

Given that this species is not found within the project boundary and with these procedures in place, the project is not likely to adversely affect Stebbins' morning-glory.

California Red-legged Frog

The nearest California red-legged frog population and critical habitats were found to be 11.5 miles from the project site and are unaffected by the project. No observations of California red-legged frog were documented within the project area. Essential components of California red-legged frog breeding habitat were present at four project facilities (Dutch Flat forebay, Dutch Flat afterbay, Little York Basin, and Chicago Park forebay), but the habitat has marginal quality because of the presence of predatory fish and other factors (table 3-207). Additionally, there are only a few other sites within the 1-mile dispersal distance of any of these project facilities that could potentially support California red-legged frog breeding. Overall, there is a low probability that California red-legged frog occurs at any facility in the Yuba-Bear Project, where potential habitat is either absent, of marginal quality, or at non-project sites.

Our Analysis

There is a low probability that California red-legged frog occurs at any facility in the Yuba-Bear Project where potential habitat is either absent, of marginal quality, or at non-project sites. However, the presence of the species cannot be disproved without extensive surveys throughout the area, most of which is on private property.

Project sites exhibiting essential components of California red-legged frog breeding habitat, including Dutch Flat forebay and afterbay, Little York basin, and Chicago Park forebay, were characterized as small water bodies with emergent vegetation or dense, overhanging shrubs at the margins. Dutch Flat afterbay and forebay are characterized by perennial, deep, slow-moving water and banks covered with dense Himalayan blackberry, that might constitute potential breeding habitat for red-legged frogs. No information regarding fish species in the Dutch Flat afterbay exists; however, fish were observed in the site during the assessment, and species known to occur in the Bear River immediately upstream of the Dutch Flat afterbay (brown trout and green sunfish) likely occur there as well.

Little York Basin consists of deep, slow-moving water and dense margin and overhanging vegetation. Fish, however, are known to occur in the Little York basin. Although there is evidence of

essential components of California red-legged frog breeding habitat in the Chicago Park forebay, there is a lack of suitable pools and emergent vegetation and largely unvegetated banks that can limit suitability for the California red-legged frog. Introduced fish are also present.

Stream reaches affected by the project do not contain breeding habitat, but might provide suitable non-breeding summer habitat. It is unlikely that any effects of project on streamflows would potential use as non-breeding habitat.

NID's proposals to meet annually with the Forest Service and BLM to review pertinent special status species lists and to consult with the Forest Service and BLM on potential effects of new facilities on special status species on federal land, as previously discussed in the *General Protection Measures* section, would help protect red-legged frogs, if present.

Given the low probability of occurrence of this species and marginal habitat and with these procedures in place, the project is not likely to adversely affect the California red-legged frog.

3.3.5 Recreation Resources

3.3.5.1 Affected Environment

Regional Recreational Resources

Opportunities for recreation within the region surrounding the Yuba-Bear and Drum-Spaulding Projects are plentiful. The projects partially lie within and adjacent to the Tahoe National Forest, which provides formal and informal recreation facilities and opportunities for the public. Regional recreational opportunities include camping, angling, motorized and non-motorized boating, swimming, hiking, scuba diving, picnicking, sightseeing, wildlife viewing, OHV use, hunting, snowmobiling, cross country skiing, and snowshoeing.

The projects are located in northern California along the western slope of the Sierra Nevada geomorphic province in Sierra, Nevada, and Placer Counties. Other FERC-licensed hydroelectric projects in the region surrounding the Yuba-Bear and Drum-Spaulding Projects provide recreational resources similar to those available at the projects. FERC-licensed projects in the vicinity of the projects include YCWA's Yuba River Development Project (FERC No. 2246), South Feather Water and Power Agency's South Feather Power Project (FERC No. 2088), California Department of Water Resource's Oroville Facilities Project (FERC No. 2100), and PCWA's Middle Fork American River Project (FERC No. 2079).

The Yuba River Development Project provides developed and undeveloped recreation facilities, including campgrounds, picnic areas, boat launch ramps, a marina, overlook area, day-use area, and hiking trails. Recreational opportunities at the Yuba River Development Project include water skiing, wakeboarding, house boating, motorized and non-motorized boating, jet skiing, wildlife viewing, angling, hiking, and camping (YCWA, 2010).

The South Feather Power Project is located within the Plumas National Forest and provides two developed recreation areas, Little Grass Valley reservoir and Sly Creek. Recreational opportunities at the South Feather Power Project include camping, angling, hunting, picnicking, OHV use, mountain biking, water skiing, whitewater boating, snow skiing, snowmobiling, and hiking (FERC, 2009b).

The Oroville Facilities Project is located along the Feather River and several tributaries. Most of the surrounding lands are undeveloped, and developed areas are located near the Oroville dam. Recreational opportunities include camping, boating, hiking, bicycling, and OHV use. Limited

whitewater boating occurs within the project boundary when reservoir levels are low, exposing several miles of river on the Upper North Fork arm (FERC, 2007).

The Middle Fork American River Project includes campgrounds, picnic areas, boat ramps, and a scenic vista. Recreational facilities occur around French Meadows reservoir and Hell Hole reservoir. South Fork Long Canyon diversion pool and Ralston afterbay contain individual recreation facilities. Recreation opportunities included at these recreation areas include hiking, mountain biking, equestrian use, OHV use, angling, and whitewater boating (PCWA, 2011).

There are a number of whitewater boating opportunities in the region surrounding the projects (American Whitewater, 2012). Sections of the Bear River in the region range from Class II to V whitewater. Sections of the North Fork American River in the region range from Class II to V+ whitewater; the Middle Fork American River ranges from Class I to V+ whitewater; and the South Fork American River ranges from Class II+ to V+ whitewater. Sections of the North Fork Yuba River range from Class II-V whitewater; the Middle Fork Yuba River ranges from Class II-V whitewater; the South Fork Yuba River ranges from Class IV to V+ whitewater; and the Yuba River ranges from Class I to V whitewater. Sections of the Middle Fork Feather River range from Class II to II and V to V+ whitewater and the South Fork Feather River ranges from Class III to V+ whitewater.

The Pacific Crest Trail, which is not part of the projects, is a national scenic trail spanning 2,650 miles from Mexico to Canada through California, Oregon, and Washington (FERC, 2007). The trail traverses the boundary of the Jackson Meadows reservoir recreation area within the Yuba-Bear project boundary.

Project Recreational Resources

The elevation for the projects ranges from the recreation areas of White Rock Lake at 7,820 feet msl to 1,442 feet msl at Rock Creek reservoir.¹³ There are 14 designated recreation areas within the project boundaries that contain developed and undeveloped recreational areas. Interconnecting trails and tributaries between reservoirs and non-project recreation facilities offer additional opportunities for day users.

Drum-Spaulding Project

Drum-Spaulding Project recreation facilities are divided into nine recreational areas containing various recreation facilities/reservoirs and varying land ownership. PG&E manages all the recreation facilities regardless of whether they are located on PG&E or Forest Service land. Table 3-209 provides a summary of the existing recreation areas and recreation facilities available at the project. All of the existing recreation facilities are located within the proposed project boundary. The locations of each recreation area and the existing and proposed recreation facilities provided at each are shown in figures 3-111 and 3-112. Detailed maps showing the location of each existing and proposed facility within the recreation area are provided in Appendix C.

White Rock Lake Recreation Area—The White Rock Lake recreation area contains White Rock Lake reservoir and is located in the east-central portion of the Tahoe National Forest about 6 miles north of Interstate 80 (I-80). White Rock Lake provides recreational opportunities for camping, hiking, angling, hunting, and small boating. Sixty percent of the lake shoreline is accessible by foot; steep bare granite

¹³ All elevation data are in National Geodetic Vertical Datum of 1929 (NGVD 29) unless otherwise specified.

Table 3-209. Drum-Spaulling Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: PG&E, 2011a, as modified by staff)

Project Reservoir/Site	Land Ownership^a	Facilities
WHITE ROCK LAKE RECREATION AREA		
White Rock Lake	Forest Service/PG&E	6 primitive campsites with steel fire rings
FORDYCE LAKE RECREATION AREA		
Meadow Lake	Forest Service/PG&E	
Meadow Lake campground	Forest Service	2 vault restrooms (3 stalls); 15 campsites with wood picnic tables, steel fire rings, gravel spurs; wildlife-resistant food lockers; parking spaces; 1 unimproved boat launch
Meadow Lake shoreline campsites	Forest Service/PG&E	10 rustic campsites with picnic tables, fire rings, wildlife-resistant food lockers; parking spaces; 2 informal boat launches
Meadow Knoll group campground	Forest Service	2 vault restrooms (4 stalls); 2 rustic group campsites consisting of 8 wood picnic tables, 2 wood preparation tables, and 4 steel fire rings; 20 parking spaces
Lake Sterling	Forest Service/PG&E	
Lake Sterling walk-in campground	Forest Service	1 vault restroom (2 stalls); 6 rustic campsites; 10 parking spaces
Fordyce Lake	Forest Service/PG&E	6 dispersed campsites with 8 rock fire rings
LAKE SPAULDING RECREATION AREA		
Lake Spaulding	Forest Service/PG&E	
Lake Spaulding campground	PG&E	2 vault restroom (4 stalls); 25 campsites with picnic tables, steel fire rings; storage units and tent pads
Lake Spaulding overflow campground	PG&E	10 campsites
Lake Spaulding boat launch	PG&E	1 vault restroom (2 stalls); 1, 2-lane concrete boat ramp; 67 parking spaces
Lake Spaulding picnic area	PG&E	3 picnic area sites with wood picnic tables

Table 3-209. Drum-Spaulding Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: PG&E, 2011a, as modified by staff)

Project Reservoir/Site	Land Ownership^a	Facilities
Bear Valley (non-reservoir)	PG&E	
Bear Valley group campground	PG&E	2 vault restrooms (4 stalls); 1 group campsite with fire ring; 12 picnic tables; 2 grills; 16 parking spaces
Sierra Discovery Trail	PG&E	1 vault restroom (2 stalls); 4 picnic tables; 2 barbeque pits; wildlife-resistant trash receptacles; 9 parking spaces
Overflow parking	PG&E	23 parking spaces
Fuller Lake	Forest Service/PG&E	
Fuller Lake day-use area and boat launch	Forest Service	1 vault restroom (2 stalls); 1, 1-lane concrete boat launch; 14 parking spaces; 8 picnic areas with tables, fire rings, and grills
Fuller Lake angler access	PG&E	1 vault restroom (1 stall); 6 parking spaces
Rucker Lake	Forest Service/PG&E	
Rucker Lake walk-in campground	Forest Service	7 campsites with fire rings and wildlife-resistant food lockers; 4 picnic tables; 15 parking spaces
Blue Lake	Forest Service/PG&E	
Blue Lake primitive hike-in campsites	PG&E	10 primitive campsites with fire rings; 15 parking spaces
GROUSE LAKES RECREATION AREA		
Carr Lake	Forest Service/PG&E	
Carr-Feeley trailhead	Forest Service/PG&E	30 parking spaces
Carr Lake walk-in campground	Forest Service	1 vault restroom (2 stalls); 11 campsites
Feeley Lake	Forest Service	1 informal unimproved boat launch
Lower Lindsey Lake	Forest Service/PG&E	
Lower Lindsey Lake trailhead	Forest Service	20 parking spaces
Lower Lindsey Lake campground	Forest Service/PG&E	1 vault restroom (2 stalls); 12 campsites with fire rings and picnic tables; 1 unimproved boat launch

Table 3-209. Drum-Spaulding Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: PG&E, 2011a, as modified by staff)

Project Reservoir/Site	Land Ownership^a	Facilities
Middle Lindsey Lake	PG&E	
Middle Lindsey Lake primitive hike-in campsites	PG&E	3 primitive campsites with fire rings
Upper Lindsey Lake	PG&E	none
Culbertson Lake	Forest Service/PG&E/Private	
Culbertson Lake primitive hike-in campsites	Forest Service	3 primitive campsites with steel fire rings
Lower Rock Lake	PG&E	
Lower Rock Lake primitive hike-in campsites	PG&E	3 primitive campsites with steel fire rings
Upper Rock Lake	PG&E	
Upper Rock Lake primitive hike-in campsites	PG&E	3 primitive campsites with steel fire rings
KIDD LAKE RECREATION AREA		
Kidd Lake	PG&E/Private	
Kidd Lake group campground	PG&E	2 vault restrooms (4 stalls); 3 group campsites with group barbeque; 20 parking spaces; 2 storage buildings
Upper Peak Lake	Forest Service/PG&E	none
Lower Peak Lake	Forest Service/PG&E	none
LAKE VALLEY RECREATION AREA		
Kelly Lake	PG&E/Private	
Kelly Lake picnic area	PG&E	2 vault restrooms (4 stalls); 5 picnic sites; 1 unimproved boat launch; 6 undeveloped parking spaces
Lake Valley reservoir	PG&E	
Lodgepole campground	PG&E	3 vault restrooms (6 stalls); 35 campsites with each site containing a vehicle spur, fire ring, picnic table, and storage locker; 5 overflow parking spaces
Silvertip picnic area/boat launch	PG&E	1 vault restroom (2 stalls); 1,1-lane concrete boat launch; 20 parking spaces; 10 picnic sites

Table 3-209. Drum-Spaulding Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: PG&E, 2011a, as modified by staff)

Project Reservoir/Site	Land Ownership^a	Facilities
ALTA-DRUM RECREATION AREA		
Deer Creek forebay	PG&E	
Deer Creek forebay access	PG&E	5 parking spaces
Drum forebay	PG&E	Informal parking
Drum afterbay	PG&E	Informal parking
Alta forebay	PG&E	Informal parking
Halsey afterbay	PG&E	Informal parking
Wise forebay	PG&E	Informal parking
HALSEY FOREBAY RECREATION AREA		
Halsey forebay	PG&E	
Halsey forebay picnic area	PG&E	1 vault restroom (2 stalls); 9 picnic sites; 12 parking spaces
ROCK CREEK RESERVOIR RECREATION AREA		
Rock Creek reservoir	PG&E	Informal parking

^a Land ownership at a reservoir includes land owned outside of designated recreation facilities.

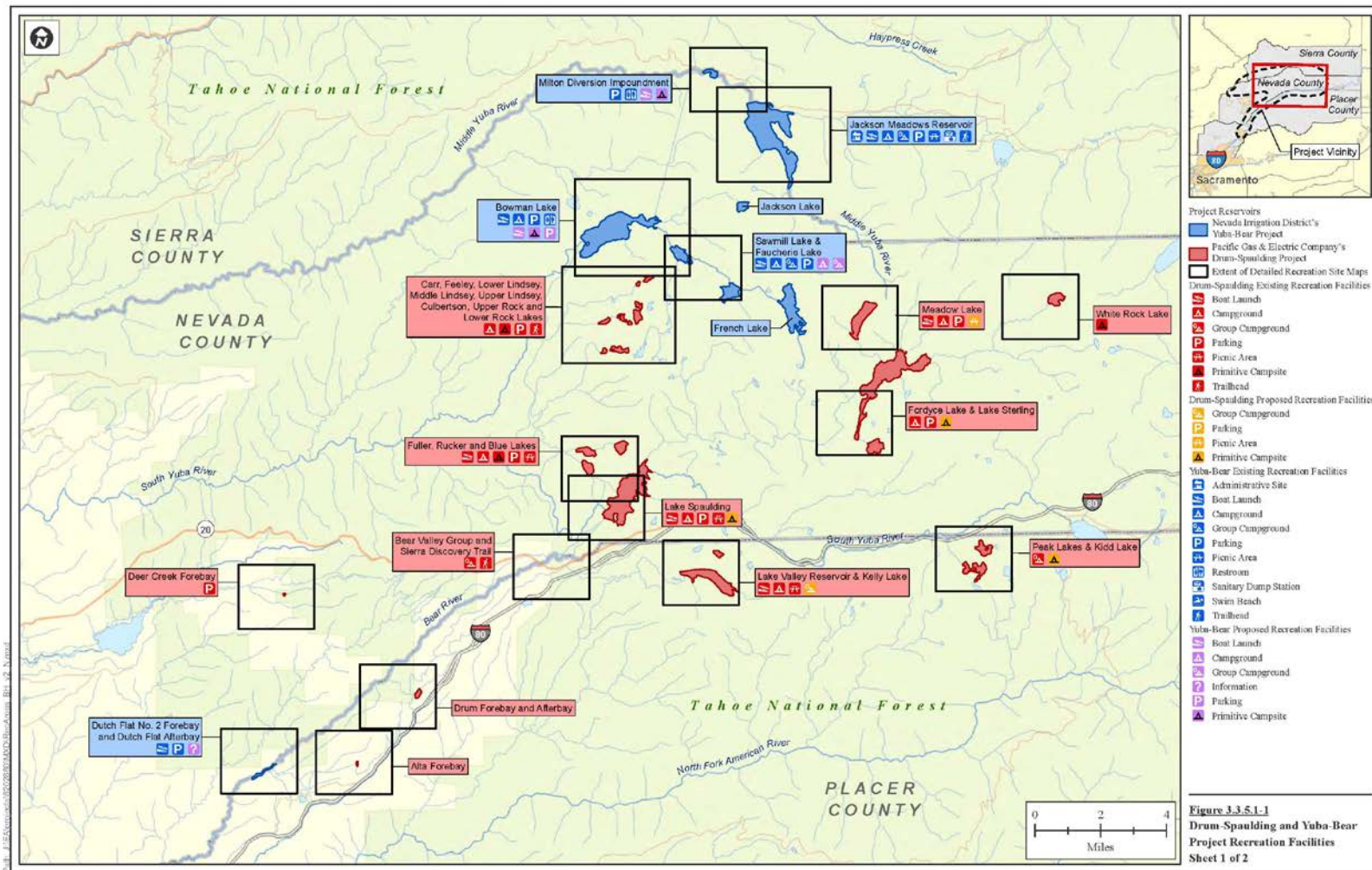


Figure 3-111. Drum-Spaulling Project and Yuba-Bear Project recreation facilities part 1. (Source: staff)

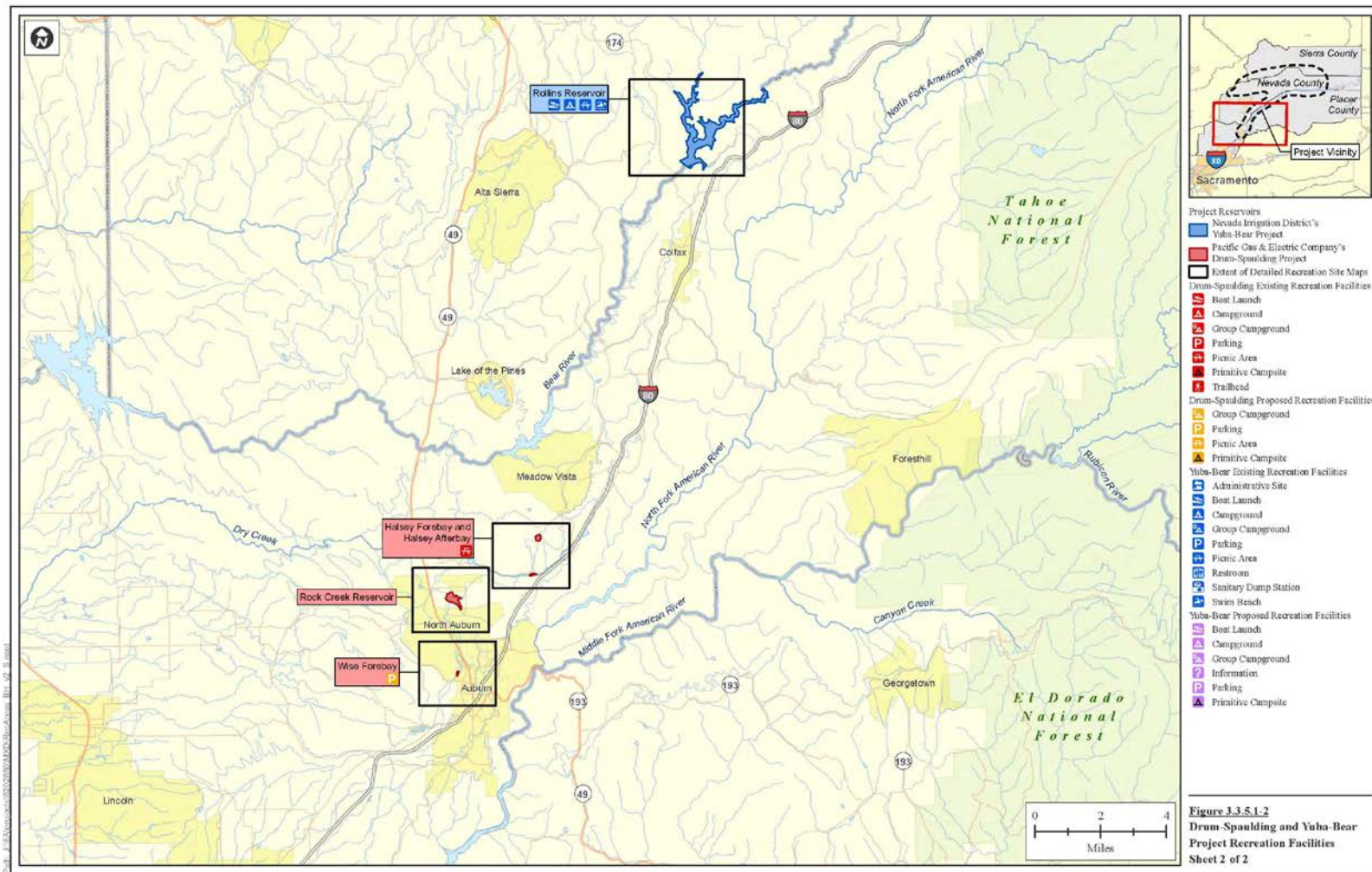


Figure 3-112. Drum-Spaulding Project and Yuba-Bear Project recreation facilities part 2. (Source: staff)

terrain makes other shoreline areas difficult to access. Nearly 40 percent of the shoreline is accessible by four-wheel drive vehicles.

Fordyce Lake Recreation Area—The Fordyce Lake recreation area is located in the central portion of the Tahoe National Forest north of I-80 with elevation ranging from 6,200 to 7,800 feet msl. There are three recreation project reservoirs, Meadow Lake, Lake Sterling, and Fordyce Lake, consisting of five recreation facilities. Recreation opportunities at Meadow Lake include angling, swimming, boating, OHV use, and recreational vehicle (RV) camping. The entire shoreline is accessible by foot, and 60 percent is accessible by vehicles on access roads along the west shoreline. When possible, California Fish and Wildlife annually stocks Meadow Lake with rainbow trout.¹⁴ Lake Sterling and Fordyce Lake provide recreational activities for camping, hiking, hunting, swimming, angling, and boating, and Fordyce Lake also provides opportunities for OHV use. The entire shoreline of Lake Sterling is accessible by foot and about 20 percent is accessible by vehicle. Sixty percent of the Fordyce Lake shoreline is accessible by foot and 30 percent is accessible by vehicle during high water periods. Undeveloped campsites exist along the west shoreline of the southern arm of the lake.

Lake Spaulding Recreation Area—Lake Spaulding recreation area consists of four project reservoirs, Lake Spaulding, Rucker Lake, Fuller Lake, and Blue Lake, and one non-reservoir recreation area (Bear Valley), in the east central portion of the Tahoe National Forest. Thick vegetation and steep granite bluffs make Lake Spaulding's shoreline only 40 percent accessible by foot with few beaches. Camping mostly occurs along the north and northeast shoreline near the mouth of South Yuba River and Fordyce Creek. Recreation opportunities available at Lake Spaulding include camping, picnicking, sightseeing, boating, swimming, angling, and waterskiing. Public access to about one-third of the northwest shoreline of Rucker Lake is restricted by private homes and a Tahoe National Forest permittee, Camp Liahona. Marsh areas also restrict shoreline access and vehicle access with about 50 percent of the shoreline accessible by foot and 15 percent accessible by vehicle. Typically, two-wheel-drive vehicles can only access Rucker Lake during dry summer months. A Nevada County ordinance prohibits internal combustion engines on Rucker Lake. Fuller Lake is the least remote and most popular reservoir in the Lake Spaulding recreation area and provides picnicking, angling, and boating opportunities, with a boating speed limit of 15 miles per hour (mph). More than 80 percent of the shoreline is accessible by foot, but much of the northern shoreline is privately owned, restricting public access. California Fish and Wildlife stocks brown or rainbow trout in Fuller Lake every other week from May through July.¹⁵ Recreation opportunities at Blue Lake include camping, hiking, angling, and swimming for both day use and overnight use by visitors. The entire shoreline of Blue Lake is accessible by foot but vehicle access (four-wheel-drive) is limited to the vicinity of the parking area near the dam. Bear Valley is a non-reservoir area that is located off Bowman Lake Road via Highway 20 and consists of three developed recreation facilities.

Grouse Lakes Recreation Area—Designated as a Forest Service non-motorized area, the Grouse Lakes recreation area consists of 8 project reservoirs and more than 14 miles of trails. Recreation

¹⁴ This stocking frequency is reported by PG&E in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. PG&E reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife does not stock all of the project reservoirs every year but does not provide any additional details for fish stocking in this reservoir.

¹⁵ This stocking frequency is reported by PG&E in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. PG&E reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife does not stock all of the project reservoirs every year but does not provide any additional details for fish stocking in this reservoir.

facilities are undeveloped in the Grouse Lakes recreation area, but opportunities exist for hiking, backpacking, mountain biking, horseback riding, camping, picnicking, swimming, and angling. The eight project reservoirs are Carr Lake, Feeley Lake, Lower Lindsey Lake, Middle Lindsey Lake, Upper Lindsey Lake, Culbertson Lake, Lower Rock Lake, and Upper Rock Lake. About 60 percent of Carr Lake's shoreline is accessible by foot; 90 percent of Feeley Lake is accessible by foot; about 80 percent of the Lower Lindsey Lake is accessible by foot; and 75 percent of Middle Lindsey Lake is accessible by foot. From the Lower Lindsey Lake trailhead, Upper Lindsey Lake is a 1.3-mile hike, and about 40 percent of the shoreline is accessible by foot due to a steep, rocky shoreline with vegetation. Culbertson Lake is a 1.3-mile hike from the Lower Lindsey Lake trailhead, and the majority of its shoreline is accessible by foot except for the eastern shoreline. Lower Rock Lake is a remotely situated 2.3-mile hike from the Lower Lindsey Lake trailhead and about 70 percent of its shoreline is accessible by foot. Upper Rock Lake is the most remote Grouse Lakes area reservoir, accessible by hiking 2.8 miles along the Lower Lindsey Lake trailhead. About 70 percent of the shoreline of Upper Rock Lake is accessible by foot.

Kidd Lake Recreation Area—Kidd Lake recreation consists of three project reservoirs, Kidd Lake, Upper Peak Lake, and Lower Peak Lake. Kidd Lake provides camping, hiking, boating, and angling opportunities. The reservoir has a 15-mph speed limit for boating and the entire shoreline of Kidd Lake is accessible by foot. Upper Peak Lake's shoreline is difficult to access (only about 25 percent of the shoreline is accessible by foot) due to steep, rocky terrain and heavy brush. The shoreline of Lower Peak Lake is more accessible than Upper Peak Lake, with about 70 percent accessible by foot and 25 percent accessible by vehicle. Recreational opportunities at the Upper and Lower Peak Lakes include hiking, undeveloped camping, angling, and boating. A non-project trailhead for the Palisades Creek Trail on Forest Service land is located near the Upper Peak Lake dam and provides access to the Wild and Scenic North Fork of the American River.

Lake Valley Recreation Area—Lake Valley recreation area consists of two project reservoirs, Kelly Lake and Lake Valley reservoir. Kelly Lake provides opportunities for picnicking, angling, swimming, and boating. Kelly Lake has a speed limit of 15 mph for boats. California Fish and Wildlife stocks Kelly Lake with rainbow trout annually, when possible.¹⁶ About 60 percent of the Kelly Lake shoreline is accessible by foot, and the only vehicle access to Kelly Lake is along the east shore. Lake Valley reservoir provides opportunities for developed camping, picnicking, angling, swimming, and boating. California Fish and Wildlife stocks Lake Valley reservoir with rainbow trout from June through August.¹⁷ Only about 40 percent of the shoreline of Lake Valley reservoir is accessible by foot due to steep terrain, and the only vehicle access is along the north shore of the reservoir.

Alta-Drum Recreation Area—Alta-Drum recreation area includes six project reservoirs: Deer Creek forebay, Drum forebay, Drum afterbay, Alta forebay, Halsey afterbay, and Wise forebay. The Alta-Drum recreation area does not charge fees for use. All six reservoirs are accessible by vehicle. No swimming is allowed in these reservoirs for safety reasons. These reservoirs provide day-use opportunities only, including shoreline angling, picnicking, and walking.

¹⁶ This stocking frequency is reported by PG&E in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. PG&E reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife does not stock all of the project reservoirs every year but does not provide any additional details for fish stocking in this reservoir.

¹⁷ This stocking frequency is reported by PG&E in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. PG&E reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife does not stock all of the project reservoirs every year but does not provide any additional details for fish stocking in this reservoir.

Halsey Forebay Recreation Area—Halsey forebay recreation area consists of Halsey forebay, located 4 miles north of Auburn, California. No recreation use fee is charged at this recreation area, and no swimming is allowed for safety reasons. About 75 percent of the reservoir shoreline is accessible by foot and vehicle access is only at the developed parking area. Only day-use is allowed at Halsey forebay, and shoreline angling and picnicking are the primary activities. California Fish and Wildlife regularly stocks the reservoir.¹⁸

Rock Creek Reservoir Recreation Area—Located 2.5 miles north of Auburn, California, Rock Creek reservoir recreation area consists of Rock Creek reservoir. No fees are charged for recreational use, and vehicle access is restricted from the reservoir shoreline. Only day-use is allowed at Rock Creek reservoir, and opportunities include shoreline angling and walking.

Yuba-Bear Project

Yuba-Bear Project recreation facilities are divided into five recreational areas containing various recreation facilities/reservoirs and varying land ownership. Table 3-210 provides a summary of the existing recreation areas and recreation facilities available at the project. All of the existing recreation facilities are located within the proposed project boundary. The locations of each recreation area and the existing and proposed recreation facilities provided at each are shown in Figures 3-111 and 3-112. Detailed maps showing the location of each existing and proposed facility within the recreation area are provided in Appendix C.

Jackson Meadows Reservoir Recreation Area—As summarized in table 3-210, the Jackson Meadows reservoir recreation area consists of 2 project reservoirs, Jackson Meadows reservoir, with 13 developed recreation facilities, and Milton diversion dam impoundment. Recreation opportunities at Jackson Meadows reservoir include camping, hiking/walking, angling, swimming, OHV use, and flat-water boating. The maximum boat speed on Jackson Meadows reservoir is 35 mph from sunrise to sunset and 10 mph sunset to sunrise. A 5-mph zone is located within 200 feet of the Woodcamp boat launch. California Fish and Wildlife stocks rainbow trout in the reservoir monthly from May through August. The Jackson Meadows sanitary dump station and Woodcamp interpretive trail are recreation facilities located at Jackson Meadows reservoir outside the project boundary. Milton diversion impoundment provides opportunities for day-use, angling, and camping. This reservoir is designated by California Fish and Wildlife as a fishing/special use area and the operation of internal combustion engines is restricted on this reservoir.

French Lake Recreation Area—The French Lake recreation area consists of one project reservoir, French Lake. There are no developed recreation facilities at French Lake, but hiking, backpacking, camping, and angling occur at the reservoir. French Lake is classified by Nevada County as a “small lake” with a maximum speed limit of 10 mph. Two undeveloped campsites are located near the dam on NID land.

Bowman Lake Recreation Area—The Bowman Lake recreation area includes three project reservoirs, Bowman Lake, Sawmill Lake, and Faucherie Lake, located along Canyon Creek. Recreational opportunities at Bowman Lake, which include camping, boating, angling, hunting, and picnicking, are dispersed along the shoreline from the dam to the inflow of Jackson Creek. There are no developed campgrounds or day-use facilities at Sawmill Lake, but several designated and dispersed recreation sites

¹⁸ This stocking frequency is reported by PG&E in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. PG&E reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife does not stock all of the project reservoirs every year but does not provide any additional details for fish stocking in this reservoir.

Table 3-210. Yuba-Bear Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: NID, 2011 as modified by staff)

Recreation Area/Project Reservoir or Site	Land Ownership^a	Facilities
JACKSON MEADOWS RECREATION AREA		
Jackson Meadows reservoir	Forest Service, NID, private	
Aspen group campground	NID	3 accessible vault restrooms (8 stalls); 35 parking spaces; 3 campsites with a water spigot, tables, fire rings, and grills; 2 wildlife-resistant dumpsters
Silvertip group campground	NID	2 accessible vault restrooms (4 stalls); 15 parking spaces with informal parking; 2 campsites with tables and fire rings
East Meadow campground	Forest Service	3 flush restrooms (9 stalls); 6 parking spaces with overflow parking; 46 campsites; 46 wildlife-resistant food lockers; and 2 wildlife-resistant dumpsters
Pass Creek campground	Forest Service	2 flush and 1 vault restroom (10 stalls); 30 campsites including 9 overflow; 4 wildlife-resistant food dumpsters
Pass Creek boat ramp	Forest Service	1 vault restroom (2 stalls); 2, 2-lane concrete boat launches; 43 parking spaces (23 main and 20 auxiliary); 1 wildlife-resistant food dumpster
Aspen picnic area	Forest Service	2 vault restrooms (5 stalls); 30 informal parking spaces; 11 picnic sites; 2 wildlife-resistant food dumpsters
Jackson Meadows Vista Point	Forest Service	1 vault restroom (1 stall); 8 parking spaces
Fir Tip campground	Forest Service	1 flush restroom (2 stalls); 12 campsites; 1 wildlife-resistant dumpster
Findley campground	Forest Service	1 flush restroom (4 stalls); 12 campsites; 1 wildlife-resistant dumpster
Woodcamp campground	Forest Service	1 flush and 1 vault restroom (6 stalls); 20 campsites; 2 wildlife-resistant dumpsters
Woodcamp picnic area	Forest Service	2 vault restrooms (5 stalls); 35 parking spaces with informal parking; 6 picnic sites; 1 wildlife-resistant dumpster
Woodcamp boat ramp	Forest Service	1 vault restroom (2 stalls); 1-lane concrete boat launch; 36 parking spaces with informal parking
Jackson Point boat-in campground	Forest Service	2 pit restrooms (2 stalls); 10 campsites

Table 3-210. Yuba-Bear Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: NID, 2011a as modified by staff)

Recreation Area/Project Reservoir or Site	Land Ownership^a	Facilities
Milton Diversion Impoundment	Forest Service	1 vault restroom (1 stall); parking; informal boat launch; 6 campsites with rock fire rings
FRENCH LAKE RECREATION AREA		
French Lake	Forest Service, NID	2 undeveloped campsites and fire rings
BOWMAN LAKE RECREATION AREA		
Bowman Lake	Forest Service, NID	
Bowman Lake campground	NID	1 restroom (1 stall); parking; 2 informal boat launch ramps; 11 rustic campsites with fire rings and picnic tables
Jackson Creek, Inflow, Milton-Bowman tunnel outlet, Big Rock, and McMurray Road Junction sites	NID	9 primitive campsites with steel fire rings
Rock Road Boat Ramp Site	NID	1 informal boat launch; 2 undeveloped campsites
Tree Camp, Burnt Tree, Peninsula, and Graniteville Road sites	Forest Service	4 primitive campsites with steel fire rings.
Sawmill Lake	Forest Service, NID	
North Shore site	NID	13 dispersed campsites with 7 steel fire rings/grills, 1 wood picnic table, 7 rock fire rings, and 1 plywood table
Dam site	NID	8 dispersed campsites with 6 steel fire rings/grills and 5 rock fire rings
Peninsula Site	Forest Service	dispersed camping area with 9 rock fire rings
East-North Shore site	Forest Service	Dispersed camping with rock fire rings; dispersed parking
Canyon Creek	Forest Service	
Canyon Creek campground	Forest Service	2 vault restrooms (4 stalls); parking; 16 campsites with picnic tables and fire rings; 7 wildlife-resistant food lockers

Table 3-210. Yuba-Bear Project recreation areas, land ownership, and recreation facilities within the project boundary. (Source: NID, 2011a as modified by staff)

Recreation Area/Project Reservoir or Site	Land Ownership^a	Facilities
Faucherie Lake	Forest Service/NID	
Faucherie Lake group campground	NID	1 restroom building (2 stalls); 2 group campsites with 8 picnic tables, 2 steel fire rings, and 4/5 tent pads; 6 wildlife-resistant food lockers; 3 wildlife-resistant trash receptacles; 1 wildlife-resistant recycling receptacle; 6 parking spaces and overflow parking at day-use and boat launch
Faucherie Lake day-use area and boat launch	NID	1 vault restroom (2 stalls); 1 informal 1-lane boat ramp; 14 parking spaces and 25 gravel parking spaces along road and in gravel lot
DUTCH FLAT RECREATION AREA		
Dutch Flat no. 2 forebay	NID	1 undeveloped parking area
Dutch Flat afterbay	BLM/NID/PG&E/Private	3 undeveloped parking areas; 1 informal boat launch
Chicago Park forebay	BLM/NID	None
ROLLINS RESERVOIR RECREATION AREA		
Rollins reservoir	BLM/NID	
Orchard Springs campground	NID	4 flush restrooms; 1, 2-lane concrete boat launch; 150 parking spaces; 101 campsites
Greenhorn campground	NID	2 flush restrooms; 1, 2-lane concrete boat launch; 143 parking spaces; 3 picnic sites; 79 campsites
Peninsula campground	NID	3 flush and 1 vault restroom; 1, 2-lane concrete boat launch; 50 parking spaces; 67 campsites
Long Ravine campground	NID	4 flush restrooms including showers at 2 restrooms; 1, 2-lane concrete boat launch; 72 parking spaces; 85 campsites

^a Land ownership at a reservoir includes land owned outside of designated recreation facilities.

do exist at four general areas along the north shore of Sawmill Lake (Peninsula, East-North Shore, North Shore, and Dam sites). Sawmill Lake is classified by Nevada County as a “small lake” with a maximum speed limit of 10 mph. California Fish and Wildlife stocks rainbow trout in Sawmill Lake once a year in conjunction with its “free fishing day” program.¹⁹ Recreational opportunities available at Faucherie Lake include camping, picnicking, boating, angling, swimming, hiking, and backpacking. A project campground is located along Canyon Creek about 1.1 miles downstream of Faucherie Lake and 0.7 mile upstream of Sawmill Lake.

Dutch Flat Recreation Area—Three project impoundments are located in the Dutch Flat recreation area: Dutch Flat no. 2 forebay, Dutch Flat afterbay, and Chicago Park forebay. Dutch Flat no. 2 forebay and Dutch Flat afterbay are located just outside of the Tahoe National Forest. No developed recreation facilities are provided at this recreation area, but undeveloped parking areas are located at Dutch Flat no. 2 forebay and Dutch Flat afterbay, and an informal boat launch is located at Dutch Flat afterbay. Numerous day-use activities do occur in this recreation area, including OHV use, angling, picnicking, biking, hiking, swimming, and walking.

Rollins Reservoir Recreation Area—The Rollins reservoir recreation area contains one reservoir, Rollins reservoir, with four developed recreation complexes: Orchard Springs, Greenhorn, Peninsula, and Long Ravine. Recreation at Rollins reservoir includes angling, swimming, boating, camping, hiking, and picnicking. Boating is a popular recreational activity at this reservoir. From sunrise to sunset, the maximum speed limit on the reservoir is 50 mph unless otherwise noted, and at all other times, the speed limit is 10 mph. Boats are prohibited in designated swimming areas, and a speed limit of 5 mph is in effect for designated boat launches, mooring areas, and angling areas. California Fish and Wildlife stocks rainbow trout in the reservoir every other week from February through May.

Recreational Use

To estimate visitation, NID and PG&E collected recreational use data using direct visual observations and recreation visitor use questionnaire forms during 2009 at each of the projects’ reservoirs.²⁰ Recreational use data were collected during: (1) the peak recreation season (Memorial Day weekend through Labor Day weekend); and (2) during selected shoulder season months (September 8 through October 31, 2009) at selected reservoirs. Some project reservoirs were not accessible until after the Memorial Day weekend due to snowmelt.

Recreational uses at the projects include camping, angling, motorized and non-motorized boating, swimming, hiking, picnicking, sightseeing, wildlife viewing, OHV use, hunting, and winter activities. Based on NID and PG&E visitor use surveys, the primary recreation activities within project recreation areas were angling, hiking, and camping. Table 3-211 summarizes the primary recreation activities for each of the project recreation areas.

¹⁹ This stocking frequency is reported by NID in its License Application filed in April 2011; however, the frequency of the fish stocking in this reservoir is unclear. NID reports in its reply to comments filed on September 14, 2012, that California Fish and Wildlife stocked Sawmill Lake less than half the time from 2002 to 2009, and infrequently before that.

²⁰ As requested by the Forest Service, NID also conducted recreation surveys at recreation areas along Canyon Creek, which are not project facilities or within the project boundary. Those results are not included here but are included in NID technical memorandum 8-2b (NID, 2011b).

Table 3-211. Primary recreation activities by recreation area at the Yuba-Bear and Drum-Spaulding Projects. (Source: NID, 2011a; NID, 2011b; PG&E, 2011a; PG&E, 2011b)

Activities	Yuba-Bear Project					Drum-Spaulding Project								
	Jackson Meadows Reservoir	French Lake	Bowman Lake	Dutch Flat	Rollins Reservoir	White Rock Lake	Fordyce Lake	Lake Spaulding	Grouse Lakes	Kidd Lake	Lake Valley	Alta-Drum	Halsey Forebay	Rock Creek Reservoir
Angling	√	√	√	√	√	√	√	√	√	√		√	√	√
Camping	√	√	√			√	√	√	√	√	√			
Picnicking								√	√			√		
Swimming	√		√	√		√		√	√	√	√			
Boating (any)	√		√			√		√		√	√			
Viewing scenery, wildlife, nature		√	√						√		√			
Hiking	√	√	√			√	√	√	√	√	√	√	√	√
OHV use	√			√			√							

Drum-Spaulding Project

Recreational Use Levels—The 2009 recreational use data were used to calculate the peak season recreational use at the Drum-Spaulding Project. The peak season recreational use was estimated at 85,351 recreation days²¹ (RDs). Fifty-two percent of the RDs were day use (44,121) with overnight use making up the other 48 percent (41,230 RDs). Table 3-212 provides estimated recreational use within the Drum-Spaulding Project area for each project reservoir.

²¹ A recreation day is defined as any visit by an individual for any length of time during a 24-hour period.

Table 3-212. Summary of Drum-Spaulding Project peak season recreational use estimates by tiered level of use. (Source: PG&E, 2011a;PG&E, 2011b)

Tier of Use	Project Reservoir	Peak Season Use Estimates (RDs)		
		Total	Day-Use	Overnight
Tier 1 (10,000 to 20,000 RDs)	Lake Valley reservoir	18,184	6,566	11,618
	Fuller Lake	16,178	16,178	0
	Lake Spaulding	15,361	4,510	10,851
Tier 2 (2,000 to 9,999 RDs)	Halsey forebay	6,144	6,144	0
	Meadow Lake	5,077	396	4,681
	Sierra Discovery Trail (non-reservoir)	3,445	3,445	0
	Kidd Lake	3,229	0	3,229
	Lower Lindsey Lake	2,483	328	2,155
	Upper and Lower Peak Lakes	2,428	1,477	951
	Fordyce Lake	2,389	249	2,140
	Bear Valley group campground (non-reservoir)	1,303	0	1,303
Tier 3 (Less than 2,000 RDs)	Rucker Lake	1,166	219	947
	White Rock Lake	1,159	158	1,001
	Carr and Feeley Lakes	1,127	346	781
	Drum forebay	947	947	0
	Wise forebay	889	889	0
	Lake Sterling	860	172	688
	Middle Lindsey, Upper Lindsey, Culbertson, and Rock Lakes	851	587	264
	Blue Lake	847	226	621
	Kelly Lake	673	673	0
	Halsey afterbay	511	511	0
	Rock Creek reservoir	84	84	0
	Deer Creek forebay	16	16	0
	Alta forebay	0	0	0
	Drum afterbay	0	0	0
Total		85,351	44,121	41,230

Recreational use at the project is expected to have an overall increase of 71 percent by 2050 to between 100,000 and 190,000 RDs. The annual peak season use is expected to be highest for Lake Valley reservoir and Fuller Lake with 30,000 and 40,000 RDs.

Developed Recreation Facility Occupancies—Most recreation areas in Northern California are typically at or near full capacity on holidays during the peak recreation season. The 2009 recreational use data were used to calculate the peak season (Memorial Day to Labor Day) occupancies of the developed recreation facilities at the Drum-Spaulding Project and to project facility occupancies into the future. The 2009 occupancies for the developed project campgrounds and the 2050 projected occupancies are shown in table 3-213. All of the developed campgrounds are currently below 75 percent capacity except for the Bear Valley group campground, which is close to full capacity (92 percent) on weekends. Three campgrounds are projected to exceed full capacity and four others will be approaching full capacity for weekend use by 2050.

Table 3-213. Projected seasonal and weekend occupancy by 2050 at Drum-Spaulding Project campgrounds for the peak season (Memorial Day to Labor Day). (Source: PG&E, 2011a; PG&E, 2011b)

Project Reservoir	Campground	Percent of Capacity			
		2009 Occupancy		2050 Projected Occupancy	
		Seasonal	Weekend	Seasonal	Weekend
Meadow Lake	Meadow Lake campground and shoreline campsites (25 sites) ^a	32	54	50	84
	Meadow Knoll group campground (2 sites)	10	25	15	39
Lake Sterling	Lake Sterling walk-in campgrounds (6 sites)	10	32	16	50
Lake Spaulding	Lake Spaulding campground (25 sites)	29	56	45	86
	Lake Spaulding overflow campground (10 sites)	10	21	16	32
Bear Valley (non-reservoir)	Bear Valley group campground (1 site)	49	92	76	142
Rucker Lake	Rucker Lake hike-in campground (1 site)	33	68	50	105
Carr Lake	Carr Lake campground (11 sites)	14	31	21	48
Lower Lindsey Lake	Lower Lindsey Lake campground (12 sites)	23	60	36	92
Kidd Lake	Kidd Lake group campground (3 sites)	38	71	59	109
Lake Valley reservoir	Lodgepole campground (35 sites)	43	61	67	94

^a Occupancy data for Meadow Lake campground and shoreline campsites were recorded for the combined 25 campsites and not separately for the 15 sites at Meadow Lake campground and the 10 sites at the shoreline campsites.

The Drum-Spaulding Project provides picnic/day-use areas and developed parking and boat launch areas. The 2009 occupancies and projected occupancies through 2050 are presented in tables 3-214 (picnic/day-use areas) and 3-215 (parking and boat launch areas). All of the day-use/picnic areas are currently below 15 percent capacity, and most are below 10 percent capacity except for the Halsey forebay picnic area. No picnic area is projected to be near full capacity by 2050. Most of the developed parking and boat launch areas are currently below 75 percent capacity except for the Fuller Lake angler access and the Carr-Feeley trailhead parking areas. The Fuller Lake angler access parking area is currently close to full capacity for seasonal use and exceeds full capacity on weekends. The Carr-Feeley trailhead is close to full capacity on weekends. Both of these parking areas are projected to be at or exceed full capacity for both seasonal and weekend use by 2050. In addition, the Silvertip day-use and boat launch area is projected to be almost at full capacity for weekend use by 2050.

Table 3-214. Projected seasonal and weekend occupancy by 2050 at Drum-Spaulding Project picnic areas for the peak season (Memorial Day to Labor Day). (Source: PG&E, 2011a; PG&E, 2011b)

Project Reservoir	Picnic/Day-Use Area	Percent of Capacity			
		2009 Occupancy		2050 Projected Occupancy	
		Seasonal	Weekend	Seasonal	Weekend
Lake Spaulding	Lake Spaulding picnic area (3 sites)	6	6	9	8
Bear Valley (non-reservoir)	Sierra Discovery Trail (4 sites)	6	4	8	6
Fuller Lake	Fuller Lake day-use area (8 sites)	4	8	6	12
Kelly Lake	Kelly Lake picnic area (5 sites)	4	2	5	2
Lake Valley reservoir	Silvertip day-use area (10 sites)	3	8	5	11
Halsey forebay	Halsey forebay picnic area (9 sites)	14	14	21	20

Table 3-215. Projected seasonal and weekend occupancy by 2050 at Drum-Spaulding Project recreation parking and boat launch areas for the peak season (Memorial Day to Labor Day). (Source: PG&E, 2011a; PG&E, 2011b)

Project Reservoir	Parking Facility	Percent of Capacity			
		2009 Occupancy		2050 Projected Occupancy	
		Seasonal	Weekend	Seasonal	Weekend
Lake Sterling	Lake Sterling parking area (10 vehicles-at-one-time [VAOT])	33	44	50	67
Lake Spaulding	Lake Spaulding boat launch area (67 VAOT)	24	46	40	76
Bear Valley (non-reservoir)	Sierra Discovery Trail (9 VAOT)	21	24	35	40
Fuller Lake	Fuller Lake angler access (6 VAOT)	84	110	106	138
	Fuller Lake day-use and boat launch area (14 VAOT)	42	60	53	77
Blue Lake	Blue Lake hike-in campsites parking (15 VAOT)	14	25	19	35
Carr Lake and Feeley Lake	Carr-Feeley trailhead (30 VAOT)	61	91	99	147
Lower Lindsey Lake	Lindsey Lake trailhead (20 VAOT)	6	11	9	18
Lake Valley reservoir	Silvertip picnic area and boat launch (20 VAOT)	44	65	67	99
Halsey forebay	Halsey forebay picnic area (12 VAOT)	24	33	35	48
Kelly Lake	Kelly Lake	7	12	10	17
Drum forebay	Drum forebay	8	10	10	13
Halsey afterbay	Halsey afterbay	6	8	8	10
Rock Creek	Rock Creek reservoir	1	1	2	2

Yuba-Bear Project

Recreational Use Levels—The 2009 recreational use data were used to calculate the peak season recreational use at the Yuba-Bear Project. The peak season recreational use was estimated at 157,599 RDs. Most of the recreational use was overnight use rather than day use (64 percent of the RDs were overnight use). Rollins reservoir and Jackson Meadows reservoir are highly developed recreation

areas that together accounted for 86 percent of all recreation use at the Yuba-Bear Project (table 3-216). Project reservoirs with less than 1,000 RDs (e.g., Dutch Flat afterbay, Dutch Flat no. 2 forebay, and French Lake) accounted for about 1 percent of the total estimated recreational use at the project.

Table 3-216. Summary of Yuba-Bear Project peak season recreational use estimates by tiered level of use.^a (Source: NID, 2011a; NID, 2011b)

Tier of Use	Project Reservoir	Peak Season Use Estimates (RDs)		
		Total	Day-Use	Overnight
Tier 1 (Greater than 5,000 RDs)	Rollins reservoir	115,455	45,065	70,389
	Jackson Meadows reservoir	20,185	3,414	16,770
Tier 2 (1,000 to 5,000 RDs)	Chicago Park forebay and powerhouse	4,103	3,517	586
	Bowman Lake	5,372	648	4,723
	Faucherie Lake	4,671	1,136	3,534
	Sawmill Lake	3,547	339	3,206
	Milton diversion Impoundment	2,591	863	1,728
Tier 3 (Less than 1,000 RDs)	Dutch Flat afterbay	973	823	149
	Dutch Flat no. 2 forebay	381	318	63
	French Lake	324	117	206
Total		157,599	56,237	101,351

^a The recreation use estimates included in this table are from the Final License Application dated April 2011, which in some instances differ from the results of the 2009 recreation use and visitor surveys presented in NID's technical memorandum 8-2b (NID, 2011b).

Recreational use at the project during the peak season is projected to increase to nearly 270,000 RDs by 2050, a 71 percent increase in overall recreational use. The recreational use at Rollins reservoir may increase to more than 200,000 RDs by 2050, a 74 percent increase in use, and recreational use at Jackson Meadows may grow to nearly 32,000 RDs, a 50 percent increase in use. Both of these recreation areas are highly developed.

Developed Recreation Facility Occupancies— The 2009 recreational use data were used to calculate the peak season (Memorial Day to Labor Day) occupancies of the developed recreation facilities at the Yuba-Bear Project and to project facility occupancies into the future. The 2009 occupancies for the developed project campgrounds and the 2050 projected occupancies are shown in table 3-217. All of the developed campgrounds are currently below 75 percent capacity for seasonal use. Faucherie Lake group campground is currently at full capacity on weekends, and three campgrounds at Rollins reservoir are close to full capacity on weekends. The Faucherie Lake group campground and the three campgrounds at Rollins reservoir are projected to exceed full capacity for weekend use by 2050 and to be at full capacity or approaching full capacity for seasonal use by 2050. The fourth campground at Rollins reservoir is projected to be close to full capacity for weekend use by 2050. Most of the developed parking and boat launch areas are currently below 75 percent capacity, except for the Pass Creek boat launch (83 percent capacity) and Long Ravine boat launch (119 percent) on weekends. Both of these boat launches are

Table 3-217. Projected overall peak season occupancies for Yuba-Bear Project campgrounds through 2050 (Memorial Day to Labor Day). (Source: NID, 2011a; NID, 2011b)

Project Reservoir	Campground	Percent of Capacity			
		2009 Data		2050 Projection	
		Seasonal	Weekend	Seasonal	Weekend
Jackson Meadows reservoir ^a	East Meadow campground (46 sites)	33	--	50	--
	Pass Creek campground (30 sites)	28	--	43	--
	Findley campground (14 sites)	20	--	31	--
	Fir Top campground (12 sites)	29	--	44	--
	Woodcamp campground (20 sites)	33	--	51	--
	Combined family campgrounds (122 sites)	30	--	46	--
	Aspen group campground (3 sites) ^b	--	--	--	--
	Silvertip group campground (2 sites)	41	--	63	--
	Combined group campgrounds (5 sites)	41	--	63	--
Faucherie Lake	Faucherie Lake group campground (2 sites)	66	100	101	154
Canyon Creek ^c	Canyon Creek campground (16 sites)	--	--	--	--
Rollins reservoir	Orchard Springs campground (101 sites)	35	62	54	96
	Greenhorn campground (79 sites)	59	90	91	139
	Peninsula campground (67 sites)	63	90	97	139
	Long Ravine campground (85 sites)	67	95	103	146
	Combined family campgrounds (332 sites)	55	83	84	128

^a Weekend data were not collected in June for Jackson Meadows reservoir by the Forest Service. Therefore, weekend occupancy for 2009 could not be accurately calculated without June occupancy information. Seasonal data were recorded by Tahoe National Forest concessionaires on a weekly basis.

^b Data were not collected by Tahoe National Forest concessionaires in 2009 for Aspen group campground.

^c Occupancy data were not recorded for Canyon Creek.

projected to exceed full capacity by 2050 for weekend use and be close to full capacity for seasonal use by 2050. Several other boat launches are expected to exceed or be close to full capacity by 2050.

The Yuba-Bear Project provides developed parking areas at seven boat launches, two picnic areas, and one picnic area/swim beach. The 2009 occupancies and projected occupancies through 2050 are presented in table 3-218.

Table 3-218. Project overall peak season occupancies for Yuba-Bear Project parking areas by reservoir through 2050 (Memorial Day to Labor Day). (Source: NID, 2011a; NID, 2011b)

Project Reservoir	Parking Facility	Percent of Capacity			
		2009 Data		2050 Projection	
		Seasonal	Weekend	Seasonal	Weekend
Jackson Meadows reservoir	Pass Creek boat launch (23 VAOT high water ^a)	60	83	99	138
	Pass Creek boat launch (43 VAOT, low water ^b)	36	67	60	111
	Woodcamp boat launch (36 VAOT)	10	8	16	13
	Combined boat launches (59 VAOT, high water)	31	38	50	63
	Combined boat launches (79 VAOT, low water)	24	40	40	66
	Woodcamp picnic area (35 VAOT)	6	6	8	9
	Aspen picnic area (30 VAOT)	4	7	6	10
	Combined picnic areas (65 VAOT)	5	6	7	9
Faucherie Lake	Faucherie Lake day-use area and boat launch (14 VAOT)	23	52	36	82
Rollins reservoir	Orchard Springs boat launch (150 VAOT)	19	40	31	66
	Greenhorn boat launch (108 VAOT)	50	76	82	126
	Peninsula boat launch (50 VAOT)	34	51	63	96
	Long Ravine boat launch (72 VAOT)	56	119	93	199
	Combined boat launches (380 VAOT)	37	67	61	112
	Greenhorn picnic area and swim beach (35 VAOT)	16	24	23	34

^a High water: Memorial Day – July.

^b Low water: August – Labor Day.

Usable Periods of Project Boat Launch Ramps

The boat ramps at the projects are usable under existing project operations during different periods of the recreation season, depending on the median daily reservoir water surface elevation. A boat ramp is considered usable if the median daily reservoir water surface elevation is no less than 3 feet above the end of the constructed ramp, per the California Boating design guidelines.

Drum-Spaulding Project

The Drum-Spaulding Project has three developed formal boat ramps. Table 3-219 summarizes the minimum usable water surface elevation under existing project operations and the usable period for each developed boat ramp by water year type. The Fuller Lake boat ramp is usable year-round. Under existing project operations, the Lake Spaulding boat ramp is usable from May 1 through September 30 in all water year types, except critically dry years when the boat ramp is not usable for any period. The Silvertip boat ramp at Lake Valley reservoir is not usable during critically dry years, but is usable from May 1 through July 1 in wet and above normal years, June 1 through July 1 in below normal years, and mid-June only in dry years.

Table 3-219. Usable periods of Drum-Spaulding Project boat ramps by water year type under existing project operations. (Source: PG&E, 2011a and PG&E, 2011c)

Boat Launch	Minimum Usable Water Surface Elevation (feet msl)	Boat Ramp Usable Period by Water Year Type				
		Wet	Above Normal	Below Normal	Dry	Critically Dry
Lake Spaulding Boat Ramp	4,942.9	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30 ^a	--
Fuller Lake Boat Ramp	5,328.9	Year-round	Year-round	Year-round	Year-round	Year-round
Silvertip Boat Ramp	5,783.1	May 15 – July 1	May 15 – July 1	June 1 – July 1	mid-June	--

^a At Lake Spaulding, the boat ramp is unusable briefly during the middle of September in dry water years, but becomes usable again in late September

Yuba-Bear Project

The Yuba-Bear Project has six developed formal boat ramps. Table 3-220 summarizes the minimum usable water surface elevation under existing project operations and the usable period for each developed boat ramp by water year type. At Jackson Meadows reservoir, Pass Creek boat launch is usable the entire peak season (Memorial Day to Labor Day) and through September in all water year types except dry and critically dry years; the Woodcamp boat launch is usable for the entire peak season in only above normal and wet years. At Rollins reservoir, three of the boat launches are usable for the entire recreation season (May 1 through September 30) in all water year types except in critically dry years.

Table 3-220. Usable periods of Yuba-Bear Project boat ramps by water year type under existing project operations. (Source: NID, 2011a; NID 2011c, as modified by staff)

Boat Launch	Minimum Usable Water Surface Elevation (feet msl)	Boat Ramp Usable Period by Water Year Type				
		Wet	Above Normal	Below Normal	Dry	Critically Dry
Jackson Meadows Reservoir						
Pass Creek boat launch	5,996.5	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 15	--
Woodcamp boat launch	6,016.0	May 1 – Sept. 15	May 1 – Sept. 1	May 1 – Sept, 1	May 1 – July 15	--
Rollins Reservoir						
Orchard Springs boat launch	2,133.0	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Aug 15
Greenhorn boat launch	2,133.0	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Aug 15
Peninsula boat launch	2,146.0	May 1 – Sept. 15	May 1 – Sept. 15	May 1 – Sept. 15	May 1 – Sept. 15	May 1 – July 15
Long Ravine boat launch	2,137.0	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Sept. 30	May 1 – Aug 15

River Recreation

PG&E and NID investigated flow relationships for both whitewater boating and non-whitewater boating recreation activities (i.e., angling, swimming, and tubing) from 2008 through 2010. Information was gathered from stream reaches that are potentially affected by the Yuba-Bear and Drum-Spaulding Projects. All project-affected river reaches were considered for potential whitewater boating and non-whitewater boating opportunities.

Whitewater Boating

Thirteen stream reaches underwent a whitewater boating investigation as part of the Recreation Flow Study. The quality of boating along these reaches depends on the quantity of flow within the river. Project operations affect the number of days when boatable flows exist in these reaches. Table 3-221 summarizes the boatable flow ranges for the evaluated stream reaches for different types of watercraft (hardshell kayaks, rafts, and inflatable kayaks). The average number of boatable days per year for each type of watercraft under existing flow conditions (or the no-action alternative) is also summarized in table 3-221. The average number of days is based on hydrological data for the period 1976 through 2008 across all water year types.

Table 3-221. Project-affected stream reaches with existing or potential whitewater boating opportunities. (Source: NID, 2011a; PG&E, 2011a; NID, 2011c; PG&E, 2011c, as modified by staff)

River	Study Reach	Boatable Flow Ranges and Number of Boatable Days Under Existing Flow Conditions by Watercraft Type					
		Hardshell Kayak (cfs)	Hardshell Kayak (average days per year)	Raft (cfs)	Raft (average days per year)	Inflatable Kayak (cfs)	Inflatable Kayak (average days per year)
Middle Yuba River	Milton diversion dam to Plumbago	300-400	1.5	n/a ^a	—	n/a	—
	Plumbago to YCWA's Our House diversion dam	800-1,000	7.9	800-1,200	12.1	400-700	35.0
South Yuba River	Langs Crossing to Jolly Boys Mine ^b	250-400	5.3	n/a	—	n/a	—
	Jolly Boys Mine to Golden Quartz ^b	1,100-1,200	1.8	700-1,000	7.6	700-1,000	7.6
	Golden Quartz to Washington	1,000-2,200	19.7	1,000-2,200	19.7	250-350	17.9
	Washington to Edwards Crossing	700-2,200	36.1	900-3,200	26.5	250-350	21.2
	Edwards Crossing to Purdon Crossing	800-2,200	38.3	800-2,200	38.3	300-700	54.2
	Purdon Crossing to Highway 49	600-1,500	46.1	800-2,200	42.5	n/a	—
	Highway 49 to Bridgeport	500-1,100	47.3	800-1,100	17.4	n/a	—
Fordyce Creek	Fordyce Lake dam to Lake Spaulding	350-550	20.3	400-550	9.2	350-550	20.3

Table 3-221. Project-affected stream reaches with existing or potential whitewater boating opportunities. (Source: NID, 2011a; PG&E, 2011a; NID, 2011c; PG&E, 2011c, as modified by staff)

River	Study Reach	Boatable Flow Ranges and Number of Boatable Days Under Existing Flow Conditions by Watercraft Type					
		Hardshell Kayak (cfs)	Hardshell Kayak (average days per year)	Raft (cfs)	Raft (average days per year)	Inflatable Kayak (cfs)	Inflatable Kayak (average days per year)
Canyon Creek	French Lake dam to Bowman Lake	120-150	2.7 (French Lake Dam to Faucherie Lake) 6.1 (Faucherie Lake Dam to Sawmill Lake)	n/a	—	n/a	—
	Artic Mine to South Yuba River	300-400	5.5	n/a	—	300-400	15.5
Bear River	Highway 174 to Ben Taylor Road	600-1,000	41.4	n/a	—	n/a	—

^a “n/a” indicates that the study reach is not boatable by this type of watercraft based on the results of the boater surveys.

^b The study reach was from Langs Crossing to Golden Quartz, but data from the study determined that the study reach is actually two separate reaches: Langs Crossing to Jolly Boys Mine and Jolly Boys Mine to Golden Quartz.

PG&E and NID have the reliable ability to provide augmented or controlled flows in 3 of the 13 reaches: 2 reaches on Canyon Creek (French Lake Dam to Bowman Lake and Artic Mine to South Yuba River) and 1 reach on the Bear River (Highway 174 to Ben Taylor Road). To provide reliable flows in the boatable range for most types of watercraft, the reservoir water levels must be up on the spill gates for most reaches. The time period for these flows is generally limited to the spring season when natural runoff is at its peak and is dependent on the water year.

Non-Whitewater Boating

There are numerous opportunities for low-flow recreational activities such as angling, swimming, tubing, and mining. Angling is of high quality and/or popular along several study reaches, including the Middle Yuba River from Jackson Meadows dam to Milton diversion impoundment, Canyon Creek immediately downstream of Bowman Lake and at the confluence with the South Yuba River, and the South Yuba River near the town of Washington and upstream of the Golden Quartz area. Swimming and tubing are also popular non-whitewater activities that occur along reaches of the Middle Yuba River,

South Yuba River, and Bear River. Table 3-222 summarizes non-whitewater recreational opportunities and acceptable flow ranges for various stream reaches at the projects.

Table 3-222. Summary of non-whitewater recreational opportunities and acceptable flow ranges.
(Source: NID and PG&E, 2011)

Stream Reach	Estimated Acceptable Flow Range (cfs)
Middle Yuba River	
Tyler Foote Crossing (RM 26.4)	Swimming (34+), angling (34-225), and recreational mining (34+)
South Yuba River	
Langs Crossing (RM 40.0)	Swimming (8-10+)
Golden Quartz day-use and picnic areas	Swimming (8-10+), angling (8-10+), and recreational mining (8-10+)
Washington bridge	Swimming (12-15+) and angling (12-15+)
Edwards Crossing (RM 15.3)	Swimming (35+) and tubing (>35)
Purdons Crossing (RM 11.1)	Swimming (35+)
Highway 49 bridge crossing (RM 7.1)	Swimming (35+) and angling (35+)
Bridgeport at the South Yuba River State Park	Swimming (35+) and recreational mining (35+)
Bear River	
Bear River campground and day-use area	Swimming (156-575), recreational mining (156-325), and tubing (325+)
Dog Bar Road crossing (RM 3.1)	Swimming (156+), recreational mining (156+), and tubing [after mid-June (156+)]
North Fork of the North Fork American River	
Lake Valley Gap Fire area (RM 14.9) – bridge crossing site	Angling (5-25)
Lake Valley Gap Fire area (RM 14.9) – North Fork campground	Angling (5-70) and recreational mining (5+)
Lindsey Creek	
Lindsey Creek (Lower Lindsey dam to Bowman Lake Road)	Dispersed camping and equestrian use (1) (stream not likely used for any recreational activities regardless of flow due to significant vegetation in the stream)

3.3.5.2 Environmental Effects

Drum-Spaulling Project

Fish Stocking

One of the primary recreational activities associated with the project is angling. California Fish and Wildlife currently stocks several of the project reservoirs to enhance the recreational fishery. PG&E proposes to pay California Fish and Wildlife up to \$15,000 annually for the stocking of fish in Lake Spaulding. California Fish and Wildlife recommends in its recommendation 17 and the Forest Service recommends in its 10(a) recommendation 6 that PG&E fund on an annual basis the stocking of fish in Blue, Carr, Culbertson, Feeley, Fordyce, Fuller, Lower Lindsey, Upper Lindsey, Meadow, Lower Rock, Upper Rock, White Rock, and Rock Creek Lakes; Lake Sterling; Lake Valley; Lake Spaulding; and Halsey forebay. Fish species and size class stocking targets would be determined by California Fish and Wildlife, but California Fish and Wildlife and the Forest Service recommend a maximum number of fingerings and/or catchable fish that would be stocked in each of the 17 reservoirs. These agencies also recommend PG&E annually consult with California Fish and Wildlife to obtain fish stocking targets, fish species, discuss fish acquisition, and verify the completion of the previous year's stocking commitment. Finally, California Fish and Wildlife and the Forest Service recommend that at PG&E's discretion, PG&E would: (1) acquire the fish directly from approved fish hatcheries, or (2) reimburse California Fish and Wildlife for the cost of the stocking program.

In a response letter dated September 14, 2012, to California Fish and Wildlife and the Forest Service, PG&E states it would be appropriate to reimburse California Fish and Wildlife for the annual fish stocking in Lake Spaulding, Halsey forebay, Lake Valley reservoir, and Fuller, Lower Lindsey, and Blue Lakes up to the maximum levels included in the agencies' recommendations. However, PG&E disagrees with stocking all 17 reservoirs as recommended by California Fish and Wildlife and the Forest Service. PG&E states that there is no nexus between project operations and fish stocking. Further, stocking 17 reservoirs annually would cost nearly \$200,000 each year while PG&E's proposed fish stocking program is more closely tailored to recreational use of the project, and is far more economic and feasible. PG&E states that the rationale provided by the agencies does not support stocking the reservoirs on an annual basis because the averages calculated by the agencies included only the years in which stocking occurred. Those averages did not take into account the years that California Fish and Wildlife did not stock all of the reservoirs. Finally, PG&E states that it should not be responsible for the act of stocking since that responsibility is mandated to California Fish and Wildlife by California law.

Our Analysis—Angling is one of the most popular activities associated with the project, and stocking fish in project reservoirs would help ensure that the recreational fishery is maintained for the term of the new license. Based on recreation studies completed during the relicensing process, the demand for angling at the project is projected to increase about 23 percent over the term of a new license. Maintaining the existing stocking numbers in those reservoirs that receive high recreational use and high angling pressure would help meet the estimated future demand for angling at the project.

Lake Spaulding, Lake Valley reservoir, and Fuller Lake receive high recreational use while Halsey forebay, and Fordyce, Lower Lindsey, and Meadow Lakes receive moderate recreational use (PG&E, 2011a). Lake Sterling and Carr, Culbertson, Blue, Feeley, Rock Creek, Upper Lindsey, Upper Rock, Lower Rock, and White Rock Lakes receive low recreational use (PG&E, 2011a). About half or more of the visitors to Lake Spaulding, Lake Sterling, Halsey forebay, Lake Valley reservoir, Lake Sterling, Fuller Lake, and Blue Lake participated in angling. Because of the high level of recreational angling that occurs at these facilities, these reservoirs would most benefit from inclusion in a fish stocking

plan. However, periodic review of angling use levels over the term of the new license would also help inform potential modifications to the lakes and reservoirs to be included in the stocking plan.

The existing frequency that California Fish and Wildlife stocks the project reservoirs is unclear. PG&E notes that California Fish and Wildlife does not stock all of the reservoirs on an annual basis nor does California Fish and Wildlife publicize this information. Lake Sterling and Blue, Rock Creek, and White Rock Lakes are not currently stocked, although Lake Sterling and Blue and White Rock Lakes were stocked between 2000 and 2011. Stocking fish in remote reservoirs that receive low recreational use and low angling pressure on a periodic basis versus annually may be more appropriate. Many of the reservoirs recommended for fish stocking in California Fish and Wildlife's 10(j) and the Forest Service's 10(a) recommendations would require aerial stocking due to either the remoteness or access to the reservoir. These reservoirs include Carr, Culbertson, Feeley, Lower Lindsey, Upper Lindsey, Meadow, Lower Rock, Upper Rock, and White Rock Lakes and Lake Sterling. These reservoirs are generally located at higher elevations and are remote, accessible to users by foot or rough roads that require four-wheel drive or high-clearance vehicles. Most of these reservoirs receive low recreational use, except for Lower Lindsey and Meadow Lakes, which receive moderate recreational use. Furthermore, most of the access road to Lower Lindsey Lake is accessible by passenger vehicle but the majority of the access road to Meadow Lake is unpaved and rough.

Developing a fish stocking plan that would address fish stocking in Lake Spaulding, Halsey forebay, Lake Valley reservoir, and Fuller and Lower Lindsey Lakes and address fish stocking in additional reservoirs based on changes in recreational use and angling pressure, which would include annual consultation with California Fish and Wildlife to determine fish species, stocking numbers and sizes, and reservoirs to be stocked in that year, would provide the means for a coordinated fish stocking program with the flexibility to increase or decrease stocking numbers, change fish stocking sizes, and change the frequency of stocking a particular reservoir over the term of a new license. A fish stocking plan that also includes annual consultation would help address any changes in California Fish and Wildlife fish stocking management targets and the availability of hatchery fish. Developing a fish stocking plan that also includes a summary report of fish stocking activities conducted would help ensure that the project reservoirs with high recreational use and angling pressure are stocked regularly to support continued recreational fishing opportunities.

Although the responsibility of fish stocking is mandated to California Fish and Wildlife by California law, we note that PG&E is ultimately responsible for the management of all project reservoirs and project reaches and would be responsible for the stocking of fish required under a new license.

Recreation Plan

PG&E filed a Recreation Plan on April 12, 2011, with its license application and a revised Recreation Plan on August 29, 2012. PG&E proposes to implement the Recreation Plan, as approved by the Commission, within 1 year of license issuance. The proposed plan would: (1) provide recreation facilities that meet the needs of project-related recreation consistent with federal, state, and local legal requirements; (2) monitor recreation use over the term of the license to meet recreation user demand and to provide quality recreation experiences while minimizing the effects of recreation use; and (3) enhance the accessibility of project-related recreation facilities for visitors with disabilities. The proposed plan includes a number of provisions for improvements and upgrades at existing recreation facilities as well as measures to construct new facilities. Proposed new facilities and changes to existing facilities are summarized in table 3-223.

Forest Service condition 41 specifies that PG&E consult with the Forest Service to finalize the proposed Recreation Plan and submit it for Forest Service approval. The Forest Service specifies that once the Recreation Plan is complete, it will be included as part of condition 41. Forest Service condition

41 specifies 4(e) conditions for facilities on NFS lands and recommends 10(a) recommendations for facilities on PG&E lands.

California Fish and Wildlife recommends in its 10(j) recommendation 16 that PG&E consult with the Forest Service and BLM to finalize the proposed Recreation Plan and submit it for Forest Service and BLM approval. California Fish and Wildlife recommends that once the Recreation Plan is complete, it be included as part of the condition.

Table 3-223 summarizes notable differences between the recreation facilities proposed by PG&E in its revised plan and the recreation facility provisions included in Forest Service condition 41 and California Fish and Wildlife's recommendation 16. Generally, California Fish and Wildlife's recommendation 16 is nearly identical to Forest Service condition 41; however, California Fish and Wildlife's recommendation includes several recreation facility provisions that were in the original Forest Service conditions but were removed from the revised Forest Service conditions. In such instances, it is unclear if California Fish and Wildlife is still recommending these provisions since they are no longer included in Forest Service condition 41. These differences are noted in table 3-223.

We analyze specific provisions in the proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife's 10(j) recommendation 16 in the following areas: (1) recreation plan implementation and organization; (2) recreation facility construction and modification; (3) trails and access developments; (4) water system developments; (5) recreation facility operation and maintenance; (6) recreation monitoring; (7) recreation development review; (8) project patrols/law enforcement; (9) public information and education; and (10) boat ramp extensions.

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
White Rock Lake		
<i>White Rock Primitive Campsites</i>		
• Enhance campground.	• Same provision	Same as Forest Service
<i>White Rock Lake Directional Signs</i>		
• Installation of signs.	• Same provision	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Meadow Lake		
<i>Meadow Lake Dispersed Sites and Signage</i>		
<ul style="list-style-type: none"> Continue to manage the campground to a Development Level 2 standard. Within 5 years, prohibit camping along the shore except within developed sites; barricade parking areas; install new directional signs; place aggregate on the two boat launches; develop a small day-use area/interpretive site near the boat launch. 	<ul style="list-style-type: none"> Same provision with addition of installing signage on boat launches and at the campgrounds prohibiting OHV use below high water level 	Same as Forest Service
<i>Meadow Lake Shoreline Campground</i>		
<ul style="list-style-type: none"> Within 8 years, reconstruct the campground, including vault toilets; relocate and reinforce vehicle barriers to improve vehicle management at each campsite; define and armor campsites; replace entrance information board; provide pedestrian trail from Meadow Knolls group campground to the lake. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
<i>Meadow Campground</i>		
<ul style="list-style-type: none"> Within 5 years, install information boards. Within 15 years, reconstruct campground, including redesign/relocate spurs and campground roads; close non-essential routes; delineate roads with barriers; develop a potable water source. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
<i>Meadow Knolls Group Campground</i>		
<ul style="list-style-type: none"> Within 20 years of license issuance, reconstruct the group campground; gravel and barrier road and spurs; clean up down logs and slash. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Lake Sterling		
<i>Lake Sterling Primitive Campsites</i>		
<ul style="list-style-type: none"> Install and limit to 3 primitive campsites. 	<ul style="list-style-type: none"> Same provision but does not limit number of primitive campsites^a 	Same as Forest Service
<i>Lake Sterling Campground Conversion</i>		
<ul style="list-style-type: none"> Convert campground to Development Scale 3 day-use areas within 10 years. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
Fordyce Lake		
<i>Fordyce Lake Primitive Campground (New Facility)</i>		
<ul style="list-style-type: none"> Install 7 to 10 primitive campsites within 5 years. 	<ul style="list-style-type: none"> Construct 10 primitive campsites within 3 years.^a 	Same as Forest Service
<i>Fordyce Lake OHV Signage</i>		
<ul style="list-style-type: none"> Install/maintain barriers/signing to limit uncontrolled OHV access within 1 year. Dismantle and restore recreation sites within 3 years. 	<ul style="list-style-type: none"> Same provision No comparable provision 	Same as Forest Service
Lake Spaulding		
<i>Lake Spaulding Campground</i>		
<ul style="list-style-type: none"> Retrofit/relocate accessible campsite; replace campsite components as necessary; install animal-resistant food lockers; repave native surfaces. No comparable provision Repave the campground road(s). No comparable provision 	<ul style="list-style-type: none"> Same provision^a Widen road to boat launch. Widen circulation roads. Provide showers. 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
<i>Lake Spaulding Boat Launch</i>		
<ul style="list-style-type: none"> • Replace existing restrooms with accessible restrooms; provide accessible parking spaces and access to restrooms; create 1 accessible picnic site within 5 years. • Improve paved access road to boat launch. • Provide educational material on information board. 	<ul style="list-style-type: none"> • Same provision except within 10 years 	Same as Forest Service
<i>Lake Spaulding Boat-In Campground (New Facility)</i>		
<ul style="list-style-type: none"> • Construct a 12-unit boat-in campground; install a boat mooring system; dismantle user-created shoreline fire rings. • Provide the Forest Service up to \$10,000 for vault toilet pumping system and reasonable funding for maintenance. 	<ul style="list-style-type: none"> • Same provision • Provide funding to cover all costs. 	Same as Forest Service
Bear Valley		
<i>Bear Valley Group Campground</i>		
<ul style="list-style-type: none"> • Grade/level the group area; provide 2 accessible campsites; install new animal-resistant food lockers within 5 years. 	<ul style="list-style-type: none"> • Same provision; does not specify schedule for completion 	Same as Forest Service
<i>Sierra Discovery Trail</i>		
<ul style="list-style-type: none"> • Repair or replace the existing boardwalk within 3 years. 	<ul style="list-style-type: none"> • Same provision; does not specify schedule for completion^a 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Fuller Lake		
<i>Fuller Lake Day-Use Area and Boat Launch (Developmental Scale 3 Facilities)</i>		
<ul style="list-style-type: none"> Reconstruct day-use area and boat launch within 5 years. Install courtesy dock at boat ramp. Improve/expand information board. Expand the turnaround/existing parking to create trailer parking spaces. Provide additional 15-20 single vehicle parking spaces and install accessible fishing pier, restroom, one van-accessible parking space. 	<ul style="list-style-type: none"> Same provision with addition of 1 accessible picnic site No comparable provision Provide information on a bulletin board No comparable provision Construct trailhead with toilet and parking for at least 10 vehicles 	Same as Forest Service
<i>Fuller Lake Angler Access</i>		
<ul style="list-style-type: none"> Upgrade angler access area within 5 years; regrade and place gravel on parking area; develop accessible parking space. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
Rucker Lake		
<i>Rucker Lake Walk-in Campground</i>		
<ul style="list-style-type: none"> Within 2 years, install/maintain heavy-duty directional signs; rehabilitate campground features; provide 6 additional campsites; develop trail between parking and camping area. No comparable provision 	<ul style="list-style-type: none"> Same provision to be completed within 1 year of the license issuance Convert campground parking into trailhead with parking within 10 years. 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
<i>Rucker Lake Campground Conversion (New Facility)</i>		
<ul style="list-style-type: none"> Within 10 years convert to a 20-unit, drive-in, universally accessible campground; convert 2 sites to picnic sites; rehabilitate campsites east of new picnic sites and designate parking. Develop the informal boat launch as an accessible formal car-top boat launch within 10 years. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
Blue Lake		
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Improve Blue Lake dam access road to Maintenance Level 3 standard within 5 years.^a 	Same as Forest Service
<i>Blue Lake Primitive Hike-In Campsites</i>		
<ul style="list-style-type: none"> Construct a pedestrian, native surface trail within 5 years. Rehabilitate existing primitive campsites. 	<ul style="list-style-type: none"> No comparable provision No comparable provision 	Same as Forest Service
Carr Lake		
<i>Carr Lake Walk-in Campground</i>		
<ul style="list-style-type: none"> Reconstruct campground as Development Scale 2 within 5 years; add accessible toilet. Convert campsite on northern tip of the lake into an informal boat launch. Construct a trail at a reasonable grade. Develop 5-6 new, walk-in campsites on PG&E land near the dam. 	<ul style="list-style-type: none"> Same provision Same provision Trails to be 5 percent grade or less The new campsites should be on a ridge overlooking lake^a 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Lower Lindsey Lake		
<i>Lower Lindsey Lake Campground</i>		
<ul style="list-style-type: none"> Replace information board with kiosk; improve campsite vehicle spurs; convert campsite east of boat launch to picnic site; gravel boat launch/designate as a car-top boat launch within 3 years. Install directional signage for campground within 3 years. Within 15 years, redesign and reconstruct campground as Development Scale 2. 	<ul style="list-style-type: none"> Same provision to be completed within 2 years Install directional signs for trailheads within 2 years No comparable provision 	Same as Forest Service
<i>Lindsey Creek Campground (New Facility)</i>		
<ul style="list-style-type: none"> Within 10 years of license issuance or when triggers indicate that a new campground facility is needed at Lindsay Lake: Construct a 20- to 25-unit drive-in (Development Scale 3) family campground on the south side of Lindsey Creek with potable water and water distribution to trailhead and Lindsey Lake campground; access road and campground road would be gravel Maintenance Level 3 road; rock barriers; accessible vault toilets; pay station and information panel; host site. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
Middle Lindsey, Culbertson, Lower Rock, and Upper Rock Lakes		
<i>Middle Lindsey, Culbertson, Lower Rock, and Upper Rock Lakes Walk-in Campsites</i>		
<ul style="list-style-type: none"> Provide signage to primitive campsites; replace steel fire rings within 5 years. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Monitor to determine need for additional dispersed campsites 	
Kidd Lake		
<i>Kidd Lake Group Campground</i>		
<ul style="list-style-type: none"> Upgrade one campsite to meet current accessibility guidelines; install animal-resistant food lockers; improvements to group campfire areas within 5 years. 	<ul style="list-style-type: none"> Same provision 	Same as Forest Service
Lower Peak Lakes		
<i>Lower Peak Lake Primitive Campsites (New Facility)</i>		
<ul style="list-style-type: none"> Install up to 5 campsites along shoreline of Lower Peak Lake; install directional signs along Kidd Lake Road within 3 years. Install an information board within 3 years. No comparable provision 	<ul style="list-style-type: none"> Same provisions to be completed within 5 years Replace trailhead bulletin boards within 5 years. Construct/maintain non-motorized trail connecting campsites to trailhead within 5 years. 	Same as Forest Service
Upper Peak Lake		
<ul style="list-style-type: none"> Install gate to prevent vehicle access to dam/shoreline within 5 years. Construct a non-motorized, pedestrian trail from the gate to the dam at a reasonable grade within 5 years. 	<ul style="list-style-type: none"> Same provisions to be completed within 5 years Construct/maintain pedestrian trail from trailhead near Upper Peak Lake dam to the lake within 5 years. 	Same as Forest Service
Kelly Lake		
<i>Kelly Lake Picnic Area</i>		
<ul style="list-style-type: none"> Remove the 2 pit restrooms within 3 years. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
<ul style="list-style-type: none"> • Replace 3 picnic tables and remove 2 picnic tables within 3 years. • Replace vehicle barriers around the parking area; add directional signs to Kelly Lake. 	<ul style="list-style-type: none"> • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • No comparable provision • Secure/improve public road access to reservoir.
Lake Valley reservoir		
<i>Lodgepole Campground</i>		
<ul style="list-style-type: none"> • Within 2 years, upgrade campground; retrofit water spigots to accessible standards; install animal-resistant lockers. 	<ul style="list-style-type: none"> • Same provision 	Same as Forest Service
<i>Lake Valley Group Campground (New Facility)</i>		
<ul style="list-style-type: none"> • Within 5 years, develop a group campground for 50 to 100 people at Lake Valley reservoir. 	<ul style="list-style-type: none"> • During design, determine if a suitable location is available within the project boundary or expand boundary to include final location.^a 	Same as Forest Service
<i>Silvertip Picnic Area and Boat Launch</i>		
<ul style="list-style-type: none"> • Widen access road; reconfigure parking area for up to 15 single and 10 double spaces; provide accessible parking within 5 years. • Replace/relocate restroom within 5 years. • Install up to 5 additional picnic sites with 1 accessible picnic unit within 5 years. • Extend the boat ramp to provide launching through Labor Day for all water year types, except critically dry, within 5 years. 	<ul style="list-style-type: none"> • Same provisions^a • Replace/relocate restroom with accessible restroom.^a • No comparable provision • No comparable provision 	Same as Forest Service

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Deer Creek Forebay		
<ul style="list-style-type: none"> Within 2 years, install directional signs to and from the Highway 20 junction to the forebay. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision
Drum Forebay		
<ul style="list-style-type: none"> Within 2 years, install directional signs to and from the I-80 junction to the forebay. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision
Alta Forebay		
<ul style="list-style-type: none"> Within 2 years, install directional signs to and from the Alta Bonnynook Road/Baxter Road junction to the forebay. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision
Wise Forebay		
<i>Wise Forebay Parking Area (New Facility)</i>		
<ul style="list-style-type: none"> Install parking area for up to 5 vehicles (one accessible spot); install information board; install fencing between the parking lot and adjacent private property within 5 years. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision
Halsey Forebay		
<i>Halsey Forebay Picnic Area</i>		
<ul style="list-style-type: none"> Upgrade picnic site adjacent to accessible restroom to accessible standards with parking within 5 years. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> No comparable provision

Table 3-223. Notable facility differences between the provisions of PG&E's Proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife recommendation 16.
(Source: staff)

PG&E Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	California Fish and Wildlife 10(j) Measure 16 Recreation Plan Provisions
Bear River Trail		
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Cooperate with trail planners for trail along Bear River; provide perpetual public access of trail and roads across PG&E lands; support trailhead development, sanitation, and signage.^a 	Same as Forest Service

^a Forest Service condition 41 specifies these provisions as 10(a) recommendations because the facilities are not on NFS lands.

Recreation Plan Implementation and Organization

PG&E's proposed Recreation Plan is very similar to the plan outlined in Forest Service condition 41 and California Fish and Wildlife measure 16. Where differences do exist between the proposed plan and specifications made in the Forest Service condition, the differences are mostly related to detailed facility configuration, modification, or the schedule for completion.

Our Analysis— PG&E's proposed Recreation Plan would provide benefits to the public generally within 1 to 10 years. In some specific instances, the Forest Service has specified a shorter or longer time frame for completion of a particular facility modification or addition, but in most instances, the differences in timing are within 1 or 2 years. In some of these instances, existing recreational use data suggest that completion of a facility modification or addition should occur sooner or later than specifically proposed by PG&E in the plan. However, overall, the implementation of the proposed plan with all of the facility modifications and enhancements included would benefit the recreating public and is reasonable and generally consistent with Forest Service and California Fish and Wildlife's recommendations.

Recreation Facility Construction and Modification

PG&E's Recreation Plan proposes a number of upgrades, modifications, and additions to existing facilities to enhance recreational use at the project. The proposed modifications are listed in table 3-224. Most of the measures proposed are modifications to existing facilities, but PG&E also proposes to construct several new recreation facilities as well, including: (1) Fordyce Lake primitive campground, (2) Lake Spaulding boat-in campground, (3) Lower Peak Lake primitive campsites, (4) Lake Valley group campground, and (5) Wise forebay parking area. Forest Service condition 41 and California Fish and Wildlife condition 16 are consistent with PG&E's proposal to construct these new facilities. In the following section, we analyze the more significant recreation facility proposals included in PG&E's proposed plan, including: (1) animal-resistant locker additions; (2) accessible facility additions or modifications; (3) campground or campsite additions or modifications, including the addition of campsites or campgrounds to alleviate crowding, and the formalization of dispersed campsites; (4) road,

parking, and vehicle barrier additions or modifications; and (5) trail and trailhead additions or modifications

Animal-Resistant Food Lockers

Currently, not all campground and campsites located at the PG&E recreation sites are equipped with food lockers. PG&E's Recreation Plan proposes to install animal-proof food storage lockers at all overnight campsites at all walk-in campgrounds within 2 years. These campsites include: Fordyce Lake primitive campground, Lake Spaulding campground, Bear Valley group campground, Rucker Lake walk-in campground (replace smaller food lockers), Blue Lake primitive hike-in campsites, Carr Lake walk-in campground, Lower Lindsey Lake campground, Lindsey Creek campground, Kidd Lake group campground, Lower Peak Lake primitive campsites, Lake Valley group campground, and Lodgepole campground. Forest Service condition 41 and California Fish and Wildlife measure 16 specify the installation of metal animal-proof food storage lockers and the replacement of all existing plastic food storage lockers at campgrounds where lockers are missing. These campsites are the same as PG&E's proposed measure excluding campgrounds at Blue Lake, Kidd Lake, and Peak Lake.

Our Analysis—The installation of animal-resistant food lockers, as proposed, would have little to no adverse impact on the recreation sites, or on project resources, and would be a benefit to recreation users. The use of food lockers would discourage wildlife from frequenting campsites, significantly reducing the potential for human-wildlife interactions, and would improve camper safety. Installation of animal-resistant food lockers at all campsites, including dispersed primitive campsites, such as those located at Blue Lake, Kidd Lake, and Peak Lake, would also benefit both recreationists and wildlife.

Accessible Facilities

PG&E's current recreation sites do not all include accessible facilities for those visitors with disabilities. PG&E's Recreation Plan proposes to improve accessibility by adding a number of accessible facilities and improvements at the project's existing recreation sites, including accessible campsites, campgrounds, trails, vault restrooms, restrooms, parking, picnic tables, a fishing pier, an accessible fishing station, and accessible routes around picnic areas and campgrounds. Table 3-223 provides a detailed summary of accessibility improvement proposals. In most cases, the Forest Service (condition 41) and California Fish and Wildlife (measure 16) have specified or recommended similar accessibility improvements to those proposed by PG&E. In addition, Forest Service and California Fish and Wildlife specify accessibility improvements at Fuller Lake day-use and boat launch and Silvertip picnic area and boat launch (see table 3-223 for specific details).

Our Analysis—The provision of accessible recreation as proposed by PG&E and specified by the Forest Service is consistent with the Commission's policy on recreation facilities at licensed projects under which licensees are expected to consider the needs of all populations, including those with disabilities, in the design and construction of such facilities.²² Providing accessible facilities, where feasible, and improving access for all populations at the project would provide additional access to the project for persons with disabilities and would help address growing recreation demand at this project.

At Fuller Lake, PG&E proposes as part of its Recreation Plan to enhance the Fuller Lake day-use area and boat launch by improving the parking area for vehicles with trailers, and providing an accessible fishing pier. Forest Service condition 41 and California Fish and Wildlife measure 16 are generally consistent with this proposal, although the Forest Service condition includes the addition of one accessible picnic site and a bulletin board. Fishing is one of the primary recreation activities at Fuller

²² See 18 CFR § 2.7 (2010).

Lake. Currently, recreationists are provided a day-use area, boat launch, and angler access area at Fuller Lake. However, none of the existing angling or day-use facilities was designed to any accessibility guidelines. Creating an accessible fishing pier and accessible picnic sites would improve access at this site.

The Silvertip picnic area and boat launch facility at Lake Valley reservoir is in fair condition; however, some picnic tables are in poor condition and the facility is only partially accessible. PG&E proposes several modifications and upgrades to the Silvertip facilities including relocating the restrooms; and installing additional picnic sites, including one accessible site. Forest Service condition 41 and California Fish and Wildlife measure 16 are consistent with this proposal, with the exception that both agencies recommend replacing the existing restroom facilities with an accessible restroom. Although use levels at the Silvertip picnic area and boat launch are moderate (in 2009 picnic area peak season, seasonal and weekend occupancy rates were only 3 and 8 percent, respectively), providing accessible parking spaces, picnic sites, and restroom facilities would significantly improve accessibility at the day-use area.

Campgrounds and Campsites

At PG&E's project reservoir and recreation sites, camping is one of the most popular recreation activities. Camping within the project area occurs at both developed campgrounds and at designated dispersed campsites. There is also some camping that occurs at unimproved, undesignated campsites dispersed around several reservoirs. Some of the campgrounds and campsites at PG&E's project reservoir are in need of improvements associated with old or worn facilities, camping in non-designated sites, and in some cases, overcrowding or anticipated future demand. PG&E proposes a Recreation Plan that would provide improvements, modification, or upgrades to existing campgrounds and campsites located at many project recreation sites. PG&E also proposes the addition of new campgrounds at a couple of locations, including a new group campground at Lake Valley, and a new boat-in campground at Lake Spaulding. Table 3-223 provides a detailed summary of PG&E's proposals to improve, modify, expand, and reconstruct campgrounds and campsites at the project. Forest Service condition 41 specifies and California Fish and Wildlife measure 16 recommends similar campground and campsite proposals at most of the recreation sites. However, for some recreation sites Forest Service specifications and California Fish and Wildlife recommendations for campsite and campground improvements differ notably from those proposed by PG&E, including those at Fordyce Campground Development (install 10 primitive campsites) and Rucker Lake (rehabilitate campground and provide six additional campsites) (see table 3-223).

Our Analysis—For most of the project campgrounds, PG&E and the Forest Service agree on improvement measures to be implemented, particularly where improvements are based on current use and anticipated future demand. At a number of sites, such as Meadow Lake, for example, PG&E proposes and the Forest Service specifies to reconstruct and/or expand the campgrounds over time to accommodate anticipated increases in campground use and to meet future demand. In other instances, PG&E is proposing modifications to campgrounds or campsites to improve the current condition of the campground facilities and/or to consolidate dispersed camping into designated areas, with improved facilities. Improvements such as these will benefit recreation users at the project by providing safe and usable camping facilities that are designed to accommodate use by individuals, small groups, and in some cases, larger groups or families. Proposed modifications or expansions to existing campgrounds would also ensure that camping demand at the project is met now and into the future, over the new license term.

At some sites, PG&E is proposing the consolidation of camping into improved campgrounds and campsites, including designating primitive campsites, and dismantling some dispersed, non-designated campsites. For example, at Meadow Lake, PG&E proposes to eventually prohibit camping along the shoreline except at developed campsites. At Middle Lindsey, Culbertson, Lower Rock, and Upper Rock

Lakes, PG&E proposes to make minor improvements to existing primitive campsites. At all these sites, upgrading primitive campsites and eliminating others would consolidate camping and reduce human effects around the undeveloped portions of the reservoir, thereby helping to preserve the quality of the remote recreation experience at these lakes. Installation of signage would help confine use to designated areas, would reduce the potential for camping in informal, unimproved campsites, and would reduce human use effects on the reservoir shoreline by eliminating or reducing the number of informal campsites, such as vegetation impacts and shoreline erosion as discussed in section 3.3.3.2.1, *Terrestrial Resources, Environmental Effects, Vegetation*.

At Lake Valley reservoir, the Lodgepole campground is a developed campground with 35 campsites and is in good condition, and PG&E has proposed no specific modifications or upgrades to the existing campground facilities. However, use levels at the existing campground are relatively high. In 2009, peak season campground occupancy was 43 percent for the season and 61 percent on weekends. By 2050, occupancy projections are 67 percent seasonally and 94 percent on weekends. To help address the anticipated increase in use at Lake Valley, PG&E proposes the development within 5 years of a new group campground for 50 to 100 people at Lake Valley reservoir. Lake Valley is a good location for a new group campground because it provides a natural setting, gentle terrain, and good road and shoreline access. The proposed new campground would alleviate existing use pressure at the Lodgepole campground. Although a new group campground would increase recreational use and human activity at Lake Valley reservoir with all the accompanying potential for effects on shoreline resources. However, increased use is likely to continue over the term of a new license. The use is best accommodated and would have the least effect on project resources at a formal group campground that would consolidate use to a smaller area. In addition, the installation of a new group campground at Lake Valley would be anticipated to relieve some of the camping use pressure at both the Bear Valley group campground and the Kidd Lake group campground.

At Lake Spaulding, PG&E proposes the installation of a new boat-in campground. The new campground would be intended to replace undeveloped, user-created campsites that currently exist along the shoreline. PG&E also proposes to provide the Forest Service with up to \$10,000 for a vault toilet pumping system, as well as funding for system maintenance at Lake Spaulding. Lake Spaulding receives a moderate amount of recreation use. Weekend occupancy of the Lake Spaulding campground is 56 percent and is projected to rise to 86 percent by 2050. The addition of a boat-in primitive campground would help to alleviate some of the use pressure at the existing campground and would reduce informal camping along the shoreline with its accompanying effects on shoreline resources. Provisions for a boat mooring system and vault toilet pumping system would help to minimize effects on the shoreline associated with projected increase in recreational use over the term of the license. However, we note that the Commission only has authority over its licensees, and therefore, PG&E would ultimately be responsible for the installation, operation, and maintenance of any vault toilet system installed at the project.

At Fordyce Lake, there are currently no developed recreation facilities. PG&E proposes to install 7 to 10 primitive campsites at Fordyce Lake within 5 years. Forest Service condition 41 and California Fish and Wildlife measure 16 are consistent with this proposal; however, the Forest Service condition specifies the primitive campsites to be constructed within 3 years. Based on the 2009 relicensing studies, a substantial demand for primitive camping in this area exists. From the 2009 relicensing studies, 89.6 percent of the visitors stay overnight. The majority of visitors commented on the general lack of facilities at Fordyce Lake. Of the visitors surveyed for the potential of the addition of new recreation facility campsites, 14.6 percent highly preferred campsites and 29.2 percent slightly preferred the addition of new campsites. Developing the proposed primitive campsites would help to meet existing demand and would reduce the user effects generally associated with dispersed camping at undeveloped sites. Given the current level of demand, campsite development within 3 years would improve recreational use at this project development by providing improved camping facilities to meet existing user needs.

At Rucker Lake, the Rucker Lake walk-in campground is in poor to fair condition and PG&E proposes to make significant modifications and improvements. To address immediate needs, PG&E proposes to add six campsites and to develop a trail between the parking area and the campground. Over the longer term, PG&E proposes to convert the existing campground to a 20-unit campground with designated picnic sites and designated parking. In 2009, the walk-in campground peak season occupancy was 33 percent for the season and 68 percent on weekends, and by 2050, it is projected to reach 50 and 105 percent, respectively. PG&E's proposal to make initial modifications to the recreation area within 2 years should be adequate to meet recreation demand in the near term. Expanding the campground, as proposed within 10 years, would ensure that the facility meets potential future recreation demand.

Recreation Site Roads, Parking and Vehicle Barriers

An important component of many of the project recreation sites are roads and parking areas. Currently some of the recreation site circulation roads and parking areas are in need of improvement to address issues associated with location, condition, use, and crowding. PG&E proposes modifications, improvements, or upgrades to recreation site roads and parking areas to address these issues at several of the project recreation sites (see table 3-223 for specific details). At nearly all of the sites, Forest Service condition 41 specifies and California Fish and Wildlife measure 16 recommends road and parking improvements similar to those proposed by PG&E, but for some sites do not specify a schedule for completion of road and parking improvements. At Lake Spaulding campground the Forest Service specifies and California Fish and Wildlife recommends road and parking improvements in addition to those proposed by PG&E, including widening the road to the boat launch and the circulation roads (see table 3-223 for specific details).

Our Analysis—In general, expanding and widening parking areas, spurs, and access roads, such as that proposed by PG&E, would help improve the utilization of the parking areas and help meet the anticipated increase in demand. Proposed parking expansion in combination with the widening of the access road would likely result in some change in the character of the recreation site, but such differences would be small and would not be likely to affect the recreational experience of the user. In addition, repaving parking areas and access roads would help reduce the potential for road-related congestion and would create a safer situation for vehicle traffic. Adding or replacing vehicle barriers and the installation of gates at parking areas and along access roads would keep vehicles out of undesirable locations. Expanding parking areas and turnarounds near boat launches would help reduce or eliminate vehicle congestion at some sites and would meet the anticipated increase in use projected over the term of a new license. Widening of existing roads and spurs and expansion of parking areas would generally improve vehicle access to the project reservoir.

At Lake Spaulding boat launch, PG&E's proposal to provide three accessible parking spaces and pave the access road to the boat launch parking area would benefit the recreating public by improving vehicular access to the boat launch, and creating a safer situation for vehicle traffic. The Forest Service's additional specification for widening of the roads at the time of repaving would have little additional benefit to recreation users over that that would be provided by PG&E's proposal.

Host Sites

Construction of host sites is proposed within PG&E's Recreation Plan at specific recreation campgrounds. These specific sites include: Rucker Lake walk-in campground (develop Rucker campground with 1 host site within 10 years); Lindsey Creek campground (provide a host site with water, septic, and power); and Lake Valley group campground (develop host site within 5 years). The Forest Service specifies and California Fish and Wildlife recommends host sites at Rucker Lake walk-in campground and Lindsey Creek campground.

Our Analysis—Updating and providing host sites at campgrounds would improve public safety and campground management. However, the Commission cannot ensure that a host is present at every campground, or that public safety would be improved as a result of providing host sites. The responsibility for recreation facility monitoring is that of the licensee. The proposed upgrades of host sites may be useful for attracting hosts, but the Commission has no way to ensure that the presence of a host would accomplish a project purpose or improve a project effect.

Trails and Access Developments

There are numerous trails located within the project area. Some of these trails lie fully within the project boundary and connect project-related facilities. Other trails may lie outside or partially outside the project boundary and connect a project facility to a non-project facility or connect two or more non-project facilities. In addition, there are several trailheads located within the project boundary. Often these trailheads are associated with project recreation facilities such as parking areas, campgrounds, or day-use areas. In some cases, these trailheads are for trails that connect a project facility to other non-project trails or facilities. As shown in table 3-224, PG&E proposes to develop or make improvements to several trails. Forest Service condition 41 contains provisions for several trails or trail-related measures, which are also noted in the table. California Fish and Wildlife's 10(j) recommendations for trails are identical to the Forest Service condition.

Most of the trails and trail-related improvements specified by the Forest Service and recommended by California Fish and Wildlife are similar to those proposed by PG&E. However, at some sites Forest Service condition 41 and California Fish and Wildlife measure 16 include conditions/recommendations for trail-related facilities that are not proposed by PG&E as part of its Recreation Plan. For example, at Fuller Lake, the Forest Service specifies and California Fish and Wildlife recommends that PG&E construct a trailhead with toilet and parking for at least 10 vehicles. While this trailhead is located within the project boundary, the trail quickly leaves the project and connects Fuller Lake day-use area to an unidentified, non-project trail; therefore, it is difficult to determine a project purpose. At Lower Lindsey Lake, the Forest Service and California Fish and Wildlife recommend that PG&E install directional signs for trailheads. At Lower Peak Lake, the Forest Service and California Fish and Wildlife recommend that PG&E replace trailhead bulletin boards and construct a non-motorized trail connecting campsites to the trailhead.

Forest Service condition 41, California Fish and Wildlife measure 16, and BLM recommendation 1 also recommend that PG&E assist with the development of a trail along Bear River (Bear River Trail). The Bear River Trail is a 33-mile riverine recreation trail proposed along the Bear River in Placer and Nevada Counties starting at the headwaters of the Bear River in Bear Valley and ending at NID's Combie reservoir. According to BLM, about 15.5 miles of the trail would be on PG&E property, 6 miles on NID property, 4.9 miles on NFS lands, 4.4 miles on BLM lands, 2.7 miles on Placer County lands (Bear River campground), and 3 miles on private lands.

Table 3-224. Trails proposed in the PG&E Recreation Plan or included in Forest Service condition 41 and California Fish and Wildlife measure 16 Recreation Plan provisions (Source: staff)²³

Trail/Trailhead Location	PG&E Recreation Plan Proposal	Forest Service Condition 41 and California Fish and Wildlife Measure 16 Trail Provisions	Trail Description	Location of Trail
Meadow Lake	Develop pedestrian trail.	Same provision	Connects Meadow Knolls campground to Meadow Lake	Fully within project boundary
Sierra Discovery Trail	Repair or replace the existing boardwalk within 3 years.	Same provision	A 1-mile, self-guided, loop trail in Bear Valley	Location of trail could not be determined ^a
Fuller Lake	None	Construct trailhead with toilet and parking for at least 10 vehicles	Trailhead for trail that connects Fuller Lake day-use area to non-project trails	Partially within project boundary
Rucker Lake	Develop trail between existing parking and camping areas.	Same provision	Connects designated parking to walk-in campground	Location of trail could not be determined ^a
Rucker Lake	No proposal	Convert campground parking into trailhead with parking within 10 years.	Trailhead for trail that connects Rucker Lake walk-in campground to non-project trails	Partially within project boundary
Blue Lake	Construct pedestrian trail.	Same provision	Connects designated parking area to primitive campsites	Partially within project boundary
Carr Lake	Develop trail connecting new walk-in campsites.	Same provision	Connects new walk-in campsites	Fully within project boundary

²³ Staff made effort to determine if the trail is located within or outside the project boundary based on PG&E's Recreation Plan, the license applications, and California Fish and Wildlife Response to Notice of Ready for Environmental Analysis, Federal Power Act Section 10(j) and 10(a) Recommendations, Drum-Spaulding Hydroelectric Project.

Table 3-224. Trails proposed in the PG&E Recreation Plan or included in Forest Service condition 41 and California Fish and Wildlife measure 16 Recreation Plan provisions (Source: staff)²³

Trail/Trailhead Location	PG&E Recreation Plan Proposal	Forest Service Condition 41 and California Fish and Wildlife Measure 16 Trail Provisions	Trail Description	Location of Trail
Lower Peak Lakes	None	Construct non-motorized trail connecting campsites to trailhead. Replace trailhead bulletin boards.	Connects new Lower Peak Lake campsites to trailhead for trail that connects to non-project trails	Partially within project boundary
Upper Peak Lake	Construct pedestrian trail from gate to dam.	Same provision	Connects anticipated parking at new gate to lake near dam	Location of trail could not be determined ^a
Bear River Trail	None	Cooperate with trail planners for trail along Bear River; provide perpetual public access of trail and roads across PG&E lands; support trailhead development, sanitation, and signage.	Trail would be a non-project facility along the Bear River partially outside the project boundary	Partially within project boundary

^a The location is either partially or fully within project boundary but could not be determined.

Our Analysis—The Commission considers trails that connect two or more project facilities to be necessary for project purposes. Some existing project trails connect project facilities to other non-project trails or non-project recreation facilities. To the extent that such trails or trailheads already exist within the project boundary, they are considered a project facility. However, generally, new trails, trailheads or trail facilities that do not connect two project facilities are not considered necessary for project purposes. For the most part, PG&E's trail proposals seem consistent with trails that the Commission would consider necessary for project purposes. However, at some sites, it is not clear whether a proposed trail or trailhead facility is either wholly within the project boundary or is intended to connect two or more project facilities.

PG&E's proposals to develop or improve trails or trailheads would benefit recreation users. New trails that are intended to connect two or more project facilities would enhance recreational use at the project by providing improved walking/hiking access between project facilities and consolidating foot traffic to a designated trail. In addition, repair/replacement of portions of existing project trails, such as the boardwalk portion of the Sierra Discovery Trail, would help to ensure that the trail or trail facility remains safe and usable for the term of the new license. Additional trails proposed would also help to meet increased recreational demand at the project over the new license term.

At Fuller Lake, the Forest Service specifies and California Fish and Wildlife recommends that PG&E construct a trailhead with toilet and parking for at least 10 vehicles. This trailhead is for a trail that connects Fuller Lake day-use area to an unidentified trail, non-project trail; therefore, it is difficult to determine that the recommended trailhead additions serve a project purpose. The Forest Service also makes recommendations for improvements to trailheads at Lower Lindsey Lake and Lower Peak Lake. At both of these sites, the agencies' recommendations are related to trailheads for trails that quickly leave the project boundary and do not appear to connect two project facilities, and therefore are not necessary for project purposes.

The Bear River Trail is a riverine recreation trail proposed along the Bear River in Placer and Nevada Counties starting at the headwaters of the Bear River in Bear Valley and ending at NID's Combie reservoir. According to information provided by BLM, a portion of the trail would be on PG&E property; however, the exact location of the proposed trail was not provided by BLM, nor did the information provided about the proposed trail make it possible to determine what portion of the trail, if any, would lie within the project boundary. Although development of such a trail would provide benefit to recreation users within the region, based on the information provided, there does not appear to be a nexus between this trail and the project. Therefore, it would not be appropriate to require PG&E to construct this trail or to carry out measures related to this trail.

Boat Launches and Boat Ramps

Boating is a popular recreation activity at the project reservoirs. PG&E provides boat launches and boat ramps at several of the project reservoirs. Boat launches include: Meadow Lake campground (informal); Meadow Lake shoreline campsites (informal); Lake Spaulding boat launch and day-use area (concrete); Fuller Lake day-use area and boat launch (concrete); Rucker Lake walk-in campground (informal); Lower Lindsey Lake campground (informal); and Silvertip picnic area and boat launch (concrete). In addition to the boat launches provided at the project, hand launching of non-motorized boats (canoes and kayaks) may also occur elsewhere at the project reservoirs. Boat launch facilities are in need of improvement to address issues associated with worn or deteriorating facilities, vehicle launching at sites intended for hand launching, as well as use-levels and crowding.

As part of the proposed Recreation Plan, PG&E proposes modification, improvements, or upgrades to existing boat launch and boat ramp facilities at Lake Spaulding boat launch and Fuller Lake, as well as improvements to informal and car-top boat launches at Meadow Lake, Rucker Lake, Carr Lake, and Lower Lindsey Lake (see table 3-223 for details). The Forest Service and California Fish and Wildlife recommendations are consistent with PG&E with the addition of additional signage for boat launches at Meadow Lake.

Our Analysis—PG&E's proposals to modify or upgrade existing boat launch and boat ramp facilities will benefit project recreation users. At the existing Lake Spaulding boat launch facility PG&E's proposal to meet accessibility guidelines would improve access at this site and be consistent with the Commission's policy on recreation facilities at licensed projects under which licensees are expected to consider the needs of all populations in the design and construction of such facilities. Similarly, PG&E's proposal to enhance the Fuller Lake day-use area and boat launch, would improve access at this site by creating an accessible fishing pier and accessible picnic sites.

PG&E's proposals for modifying or improving informal and car-top boat launches would also greatly benefit recreation users. At Rucker Lake, PG&E's proposal to convert the existing informal boat launch into an accessible formal car-top boat launch would provide better access for small boats at Rucker Lake, and would help to consolidate boat launching activities into a specified area. Similarly, PG&E's proposal at to convert a campsite at Carr Lake walk-in campground into an informal boat launch would

improve boating access to Carr Lake and would consolidate boat launching into an improved site that is suited for that purpose.

Boat Ramp Extensions

The usability of existing boat ramps under a variety of reservoir water level conditions was an issue identified and addressed as part of the relicensing effort. PG&E evaluated the usability of boat ramps in relation to reservoir water depths, and based on the results of that assessment, PG&E's proposed Recreation Plan includes a provision to extend the boat ramp at the Silvertip boat launch at Lake Valley reservoir to provide launching capabilities through Labor Day for all water year types, except critically dry years. Forest Service condition 41 and California Fish and Wildlife 10(j) measure 16 recommend the same boat ramp extension.

Our Analysis—PG&E reports that the Silvertip boat ramp is currently functional when the reservoir is at or above elevation 5,783.1 feet msl. Water levels of the project reservoirs respond to the water year type, which is determined by the monthly natural flow for the entire water year. Table 3-225 provides the median water surface elevations for the project reservoirs with concrete boat ramps for different water year types based on tables provided by PG&E in its August 2012 supplemental filing to the amended license application.

Under PG&E's proposed streamflows, the Silvertip boat ramp would, on average, be unusable for the same periods as it would be under the no-action alternative. In all water year types, the boat ramp would, on average, be unusable for the majority of the peak recreation season (July 15 through September 30 in wet, above normal, and below normal water year types; and July 1 through September 30 in dry, critically dry, and extreme critically dry water year types). PG&E reports that critically dry/extreme critically dry water year types only occurred in 4 years (12 percent) out of the 33-year period of record (1976-2008) while all other water year types accounted for 88 percent. Although the majority of Lake Valley reservoir visitors responding to a survey conducted during the relicensing study indicated that they had no opinion or that water surface elevation was not an issue for launching a boat, Lake Valley reservoir received the highest total recreational use at the project. The proposed streamflows would not change the functional periods of the boat ramp from current conditions, but extending the ramp by approximately 7 vertical feet would make the boat ramp functional for the entire peak recreation season in most water year types. Critically dry and extreme critically dry water year types occurred infrequently and the boat ramp would need to be extended by 15 vertical feet to be functional for the entire peak recreation season in these water year types.

PG&E reports that the Lake Spaulding boat ramp is currently functional when the reservoir is at or above elevation 4,942.6 feet msl. Under PG&E's proposed streamflows, the Lake Spaulding boat ramp would, on average, be unusable for the same periods as it would be under the no-action alternative. In most water years, the boat ramp would, on average, be functional for the majority of the peak recreation season. During critically dry and extreme critically dry water years, the boat ramp would be unusable from July 1 through September 30 and, during dry water years, would be unusable September 1 through September 30. Critically dry and extreme critically dry water years occurred infrequently, and the boat ramp would need to be extended by over 40 vertical feet to be functional for the entire peak recreation season in these water year types. Although dry water years occurred about one-quarter of the time (8 years out of the 33-year period of record), the existing boat ramp would be functional for almost the entire peak recreation season, which would be similar to current conditions. The majority of Lake Spaulding visitors responding to a survey conducted during the relicensing study indicated that that reservoir water level was not an issue for launching a boat, or that they had no opinion on the matter.

Table 3-225. Median water surface elevations for Lake Spaulding, Lake Valley reservoir, and Fuller Lake. (Source: PG&E, 2011a, as modified by staff)

Water Year Types	No-Action Alternative (Elevation in feet msl)							PG&E's Amended Minimum Flow Releases (Elevation in feet msl)						
	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30
Lake Spaulding (Usable Boat Ramp Elevation 4,942.6)														
Wet	5,013.9	5,009.5	4,999.5	4,989.5	4,976.1	4,969.1	4,988.8	5,014.2	5,009.8	4,999.5	4,988.7	4,969.3	4,958.9	4,970.1
Above Normal	5,004.7	5,007.0	4,995.7	4,981.1	4,967.4	4,958.8	4,970.6	5,012.6	5,007.1	4,990.6	4,977.4	4,956.7	4,943.8	4,957.1
Below Normal	4,989.1	4,985.8	4,985.7	4,976.7	4,965.3	4,958.4	4,968.0	5,006.4	5,002.3	4,988.5	4,975.9	4,958.1	4,947.9	4,960.8
Dry	4,966.4	4,955.7	4,956.2	4,947.0	4,935.0	4,927.7	4,939.2	4,990.4	4,979.7	4,965.7	4,952.9	4,934.3	4,923.8	4,935.1
Extreme Critically Dry & Critically Dry	4,914.3	4,906.4	4,905.8	4,899.9	4,894.0	4,897.5	4,908.8	4,929.6	4,923.2	4,914.4	4,905.6	4,903.9	4,904.8	4,907.2
Lake Valley Reservoir (Usable Boat Ramp Elevation 5,783.1)														
Wet	5,783.8	5,782.6	5,781.1	5,780.1	5,778.9	5,778.1	5,777.1	5,784.0	5,782.6	5,781.0	5,780.1	5,778.9	5,778.1	5,777.1
Above Normal	5,783.7	5,782.6	5,781.1	5,780.1	5,778.9	5,778.0	5,777.0	5,783.6	5,782.5	5,781.0	5,780.1	5,778.9	5,778.0	5,777.0
Below Normal	5,783.5	5,782.6	5,781.1	5,780.1	5,778.9	5,778.0	5,777.0	5,783.2	5,782.1	5,780.8	5,780.1	5,778.9	5,778.0	5,777.0
Dry	5,781.0	5,780.0	5,788.9	5,778.0	5,776.9	5,776.0	5,774.9	5,780.0	5,779.1	5,777.8	5,778.0	5,776.9	5,776.0	5,774.9
Extreme Critically Dry & Critically Dry	5,773.2	5,772.2	5,771.0	5,770.0	5,768.9	5,768.1	5,766.6	5,770.9	5,769.8	5,768.5	5,770.0	5,768.9	5,768.1	5,766.6

Table 3-225. Median water surface elevations for Lake Spaulding, Lake Valley reservoir, and Fuller Lake. (Source: PG&E, 2011a, as modified by staff)

Water Year Types	No-Action Alternative (Elevation in feet msl)							PG&E's Amended Minimum Flow Releases (Elevation in feet msl)						
	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30
Fuller Lake (Usable Boat Ramp Elevation 5,329.9)														
Wet	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0
Above Normal	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0
Below Normal	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0
Dry	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0
Extreme Critically Dry & Critically Dry	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0	5,341.0

Note: Shaded cells indicate periods when the reservoir elevation would be below the bottom usable portion (3 vertical feet above the end of the paved ramp) of the existing ramp.

PG&E reports that the Fuller Lake boat ramp is currently functional when the reservoir is at or above elevation 5,328.9 feet msl. Under PG&E's proposed streamflows, the Fuller Lake boat ramp would, on average, be functional July 1 through September 30 (the same period as it would be under the no-action alternative) in all water year types.

Recreation Facility Operation and Maintenance

PG&E's proposed Recreation Plan outlines provisions for O&M of project recreation facilities. PG&E would continue to be responsible for operating and maintaining all project facilities located within the project boundary. On NFS lands within the project boundary, the standards for operating and maintaining recreation sites would be consistent with current Forest Service standards and policies. PG&E proposes to continue using a concessionaire for the O&M of project recreation facilities. Most project campgrounds have hosts (generally, there are 10 hosts) who operate and maintain the campground and project recreation facilities at other nearby project reservoirs. PG&E's proposed Recreation Plan also includes the most recent Operating Plan that was prepared under a Memorandum of Understanding with the Tahoe National Forest in 2005. The plan is updated annually and details the agreement reached by PG&E and the Forest Service related to PG&E and Forest Service O&M responsibilities.

The Forest Service includes provisions in condition 41 to address O&M of project recreation facilities on NFS lands that are generally consistent with those proposed in PG&E's Recreation Plan.

California Fish and Wildlife includes provisions in its 10(j) measure 16 to address O&M that are identical to those included in Forest Service condition 41.

Our Analysis—O&M associated with the project's recreation facilities helps to ensure that these facilities and associated public recreational access are provided over the term of the license. PG&E is responsible for the management, operation, and routine maintenance of all recreation facilities within the project boundary to provide safe and adequate public access to the project. Although an annual operating plan between PG&E and the Tahoe National Forest currently exists, PG&E would ultimately be responsible for all existing and future recreation facilities upon license issuance.

Water System Developments

PG&E's proposed Recreation Plan indicates that PG&E anticipates that all water systems at the project would need to be upgraded at least once during the license term, i.e., replacing the existing distribution piping, connections, and water hydrants, while maintaining the same system design and footprint, as needed. PG&E's proposed Recreation Plan identifies several specific provisions to develop water systems and potable water at project recreation facilities, including: development of a potable water source at Meadow Lake campground; a water system with two to four water spigots at the proposed Lake Valley group campground; a potable water supply with distribution system at Rucker Lake walk-in campground; and a potable water supply at Lindsey Creek campground, and distribution of water to Lindsey trailhead and Lindsey Lake campground.

Overall, PG&E proposes to ensure that recreation facilities on NFS land that provide drinking water, as well as future drinking water systems, be managed as public drinking water systems (i.e., serve at least 15 service connections or 25 persons) under the federal Safe Drinking Water Act. In addition, PG&E proposes, during the planning for water distribution system replacement, to evaluate if the footprint should be reviewed to determine if there is a design or technologies that can be reasonably implemented that would better serve recreation users. However, from the information provided, it is unclear as to exactly what this proposal entails.

Under condition 41, the Forest Service specifies that PG&E ensure recreation facilities that provide drinking water, as well as future drinking water systems, be managed as public drinking water systems (i.e., serve at least 15 service connections or 25 persons) under the Safe Drinking Water Act. The Forest Service specifies that PG&E develop and provide potable water with a distribution system at Rucker Lake walk-in campground, and provide potable water at Lindsey Creek campground and distribute water to Lindsey trailhead and Lindsey Lake campground.

California Fish and Wildlife includes provisions in its 10(j) measure 16 to address water systems that are identical to those included in Forest Service condition 41.

Our Analysis—Relicensing studies indicate the need for additional potable water at some of the project recreation facilities. Visitors reported a preference to have potable water at Meadow Lake, Lake Valley, Rucker Lake, and Lindsey Creek, where drinking water is not currently provided. Water systems are integral to the recreation sites they serve. Providing potable water would help address the needs at project sites by providing more sources of drinking water for visitors at the project. The addition of potable water would also enhance the recreational experience at these sites, and is consistent with facilities and services that recreation users would expect at similar regional recreation sites designated under the Forest Service Recreation Opportunity Spectrum (ROS) as “rural and roaded natural”.

Although Forest Service policy states that all water systems be managed as public drinking water systems (i.e., serve at least 15 service connections or 25 persons) under the Safe Drinking Water Act, there is no guarantee that PG&E would be able to manage the public water systems to serve 15 service connections or 25 persons at the project. Furthermore, regulating and enforcing drinking water laws are outside the Commission’s authority. In Sierra County, the California Department of Public Health regulates and enforces the drinking water quality laws and regulations. Nevada and Placer Counties regulate and enforce the drinking water laws and regulations through their own health departments.

PG&E’s proposal to, during the planning for replacement of water distribution systems, evaluate if the footprint should be reviewed to determine if there is a design that would better serve recreationists would help address the need for additional potable water at the project. However, from the information provided, it is unclear as to exactly what this proposal entails.

Recreation Monitoring

PG&E’s proposed Recreation Plan outlines detailed components of its proposed recreation monitoring for the term of a new license at the project. PG&E proposes a facility and social monitoring approach that uses monitoring indicators and standards, such as occupancy rate and user preferences. If monitoring shows that conditions exceed acceptable levels as defined by standards, an “impact problem” would be said to exist, and appropriate management actions would be considered. PG&E also proposes a recreation survey every 12 years to measure social indicators, such as perceived crowding of land and reservoir water surface areas, conflict between user groups, and information on users’ recreation activities.

PG&E’s proposed Recreation Plan outlines several methods to collect information on the recreation monitoring indicators and standards, including: collection of existing available daily annual occupancy information; a recreation observation survey that would include surveying during peak-use periods; compiling annual occupancy counts from non-holiday Saturdays from Memorial Day through Labor Day; and conducting a recreation user survey during prime recreation seasons. As part of ongoing annual O&M activities, PG&E would assess the amount of dumping and litter, user-created fire rings, and human and pet waste at the project’s developed and dispersed recreation sites.

PG&E proposes to prepare a recreation monitoring report every 6 years, to coincide with the FERC Form 80 monitoring reports. The recreation monitoring report would summarize the data for the current monitoring period and, if appropriate, make management recommendations if monitoring indicators exceed established standards. Every 12 years, PG&E proposes to include results from the recreation user survey into the recreation monitoring report. For facilities on NFS land, PG&E proposes to provide a draft of the final reports to the Forest Service and other applicable agencies, as appropriate for a 30-day review. In addition, PG&E would meet with the Forest Service and any other applicable land management agencies during the 30-day review period to discuss potential reasonable resource management measures on the respective land management agency's lands based on the report results. PG&E proposes to file the final recreation monitoring reports, including evidence of consultation, with FERC concurrent with the Form 80 Report filing.

Forest Service condition 37 specifies that PG&E conduct recreation survey and monitoring as follows:

- PG&E would conduct recreation monitoring on NFS land once every 6 years that would include evaluation of resource effects from developed and dispersed use, including evidence of garbage and human waste left onsite. The Forest Service would be involved in the evaluation of resource effects on NFS lands.
- PG&E would conduct occupancy surveys of project facilities on NFS land on a 3- and/or 6-year cycle as described in the Drum-Spaulding and Yuba-Bear Recreation Trigger Plan (attached to the Forest Service 4(e) conditions for the project). This Trigger Plan is a detailed plan that includes monitoring indicators, methods, triggers and actions for hosted/reservation campgrounds and self-pay/no-host campgrounds, day-use facilities, and primitive campsites.
- PG&E would conduct a recreation user survey on NFS land once every 12 years. The first visitor survey would be conducted in the first Form 80 reporting year following license issuance. Survey methods and questions would be reviewed and approved by the Forest Service in advance, and survey information would be reviewed by the Forest Service.
- At 6 and 12 years after license issuance, PG&E would prepare the recreation monitoring and survey report, which would be provided to the Forest Service for review, comment, and approval prior to filing with the Commission. Both the 6- and 12-year recreation monitoring and survey reports would incorporate data from the information listed above; traffic counters; other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, and project patrol reports; and other applicable information. PG&E would file a recreation resources report in compliance with the regulations at 18 CFR §8.11, or as amended.

Forest Service condition 37 specifies that within 1 year of submission of the recreation resources report, PG&E would consult with the Forest Service to review this report and propose appropriate management actions.

California Fish and Wildlife's 10(j) recommendation 12 is generally the same as Forest Service condition 37 except that California Fish and Wildlife's recommendation does not limit the recreation monitoring to NFS land and California Fish and Wildlife recommends that PG&E conduct occupancy surveys of all project recreation facilities on a 6-year cycle.

PG&E's alternative condition to Forest Service condition 37 is to implement the proposed recreation monitoring, which is generally consistent with Forest Service condition 37, except for minor differences including the frequency and duration of the occupancy surveys.

Our Analysis—Recreational use at the project is expected to increase by about 23 percent over the next 30 years. The level and type of recreational use and recreation user preferences could change over the term of a new license. Regular monitoring of recreational use, surveying recreation users, and assessing facility capacity and recreation demand would help to determine whether project recreation facilities meet demand and visitor needs over the term of the license, and whether recreational use is affecting other resources at the project. The recreation monitoring measures included in PG&E's proposed Recreation Plan, specified by the Forest Service, and recommended by California Fish and Wildlife, would all meet the same overall goals.

Conducting recreation monitoring at all project facilities as proposed by PG&E and recommended by California Fish and Wildlife would be appropriate to provide project-wide information. The schedule for occupancy surveys as specified by the Forest Service is unnecessary because it would be more frequent than the Commission's standard license requirement. The Commission's standard license requirement is sufficient for tracking changes in project use and condition over the term of a new license. The recreation monitoring proposed by PG&E would account for areas that receive very little visitation and the variation among different areas. Specifically, PG&E's proposed recreation monitoring allows for the use of additional survey days, when needed, to achieve a minimum of six surveys to calculate the average annual occupancy rate, and a 4-hour period to conduct counts. The proposed reports would provide the means to document the survey information and monitor other recreational management provisions, such as litter and human waste monitoring. Reporting the recreation monitoring results every 6 and 12 years concurrent with the Commission's Form 80 Report schedule would ensure that the Commission is updated on recreational use at the project.

Recreation Development Review

PG&E's proposed Recreation Plan includes a provision to meet, at least every 6 years, with the Forest Service to review the conditions of project recreation facilities located on NFS land and to agree on necessary replacement and major maintenance (i.e., reconstruction) work, and to agree on the schedule for this work. For project recreation facilities located on NFS lands, PG&E would use the Forest Service's standards for the frequency of rehabilitation or heavy maintenance as a guideline, but not as a prescription, for scheduling replacement and major maintenance work. Following the review, PG&E would develop a 6-year schedule for replacement and/or reconstruction of project recreation facilities on NFS lands that would be approved by the Forest Service prior to being filed with the Commission.

Forest Service condition 39 specifies that PG&E and the Forest Service would meet at least once every 6 years to review all project recreation facilities and to agree on necessary maintenance, rehabilitation, construction, and reconstruction work. This condition is generally the same as PG&E's provision, except that the Forest Service specifies the review be conducted for all project recreation facilities.

California Fish and Wildlife 10(a) recommendation 14 is identical to Forest Service condition 39, except that it includes BLM in the review process in addition to the Forest Service.

PG&E's alternative condition to Forest Service condition 39 is the deletion of condition 39 because this measure is addressed in the proposed Recreation Plan.

Our Analysis—Discussing all project recreation facilities during the recreation development review meeting as specified by the Forest Service and recommended by California Fish and Wildlife would ensure that reconstruction and rehabilitation activities are consulted upon and scheduled in a coordinated manner. It would also be appropriate for the 6-year schedule that is developed as a result of the recreation review to include all project recreation facilities as specified by the Forest Service and recommended by California Fish and Wildlife. Although there are 10.6 acres of BLM lands within the

existing project boundary, none of the project recreation facilities occupy BLM lands. Therefore, requiring the inclusion of BLM for the review meeting would not be necessary. However, PG&E is free to consult with BLM or any other interested stakeholder about its proposed schedule. Notifying BLM of the schedule and any proposed work in the vicinity of BLM lands before construction begins would ensure that BLM is kept apprised of any work that could affect BLM lands.

Project Patrols/Law Enforcement

PG&E's proposed Recreation Plan includes several provisions for project patrols. PG&E proposes to provide a project patrol to monitor and limit camping at Lake Sterling to three primitive campsites. It also proposes to provide management presence through a person who would patrol Fordyce and Sterling Lakes during the peak recreation season to manage recreation use and enforce appropriate regulations. The proposed Recreation Plan includes a provision for hosts to patrol designated primitive campsites at the project reservoirs during the peak recreation season.

PG&E's proposed Recreation Plan also includes a provision to coordinate, within 1 year of license issuance, with the Forest Service to develop a plan to address the costs of managing project-related recreation on NFS lands, and, when appropriate, PG&E lands located within or adjacent to project lands and waters, including providing for patrols during the fire season and the recreation season and for law enforcement activities.

The Forest Service includes provisions in condition 41 to address project patrols and hosts. The Forest Service specifies providing a management presence through a person who would patrol Fordyce and Sterling Lakes during the peak recreation season, which is identical to the PG&E proposed provision. The Forest Service provisions for campground hosts are the same as those proposed by PG&E. The Forest Service also includes a provision in condition 41 specifying that PG&E coordinate with the Forest Service within 1 year of license issuance to develop a plan to address the costs of managing project-related recreation on NFS lands. This provision is generally the same as that proposed by PG&E.

California Fish and Wildlife includes provisions in its 10(j) recommendation 16 to address project patrols and hosts and to address the costs of managing project-related recreation on NFS lands. These provisions are identical to those included in Forest Service condition 41. Placer County recommends that PG&E contribute to the costs of increased county services resulting from the proposed project, such as law enforcement at the new campground at Lake Valley reservoir within Placer County. Placer County notes that PG&E and the County are trying to reach an agreement; however, if this agreement is not reached, PG&E should be required by the new license to compensate Placer County for the costs of any increased county services that have a nexus to the project.

Our Analysis—Project patrol provisions would help encourage visitors, including campground users, OHV users, anglers, and boaters, to comply with regulations and project rules. A projected increase in the number of visitors over the term of the new license would likely increase the need for public services, including law enforcement and fire protection, which are provided by the Sheriff's offices in Nevada, Sierra, and Placer Counties. A project patrol person would help reduce conflicts between recreation users and improve visitor safety by providing an authoritative presence to encourage compliance with regulations and project rules. Additional project patrol at the more remote areas of the project would improve management of environmental resources by increasing visitor contact with enforcement agencies and help to educate visitors about appropriate and restricted uses.

Within the project area, public safety and law enforcement duties are the responsibility of the Sheriff's offices in Nevada, Sierra, and Placer Counties; the California Highway Patrol; and federal agencies on federal lands. PG&E already provides law enforcement funding through public land use fees and county taxes because of the project. Further, Forest Service law enforcement personnel from the

Tahoe National Forest are responsible for enforcing regulations related to the management of NFS lands and resources. The Commission has no way of ensuring that the hiring of a patrol person paid for by PG&E (in this case staffing or funding a seasonal or year-round employee) or providing funding to the Forest Service or Placer County would accomplish a project purpose or ameliorate a project effect. However, the Commission can enforce specific measurable actions, such as O&M provisions, including maintenance of project lands and project recreation facilities to address fire safety and vandalism and other associated potential effects of dispersed recreation use within the project boundary. While improved implementation of Forest Service and Nevada, Sierra, and Placer County standards and guidelines regarding recreational use would be beneficial, enforcement of those regulations would be outside the Commission's jurisdiction and responsibility.

PG&E's proposed Recreation Plan, Forest Service condition 41, and California Fish and Wildlife 10(j) recommendation 16 include provisions for PG&E to develop a plan to provide funding for the Forest Service to address the costs of managing project-related recreation on NFS lands. This would be a good mechanism to determine sharing costs; however, PG&E is ultimately responsible for the O&M of the project recreation facilities.

Public Information, Signage, and Education

PG&E proposes to, within 2 years of license issuance, in coordination with the Forest Service for NFS lands, develop an information strategy that includes maps, signs, and a PG&E public website(s) to provide information to enhance project recreation opportunities, protect the natural area, and interpret cultural resources. This strategy would include the signs proposed at each project recreation facility. For signs proposed on NFS land, PG&E would use Forest Service sign guidelines and receive Forest Service approval prior to installation. At boat launch sites, within 1 year of license issuance, PG&E would install water resource related messages, including lake surface regulations such as county speed limits, direction of travel, and motorized or internal combustion engine restrictions. At applicable reservoirs, PG&E would install, within 2 years of license issuance, information signs to prevent the spread of invasive aquatic species and waterborne pathogens at the project. An implementation schedule would be part of this strategy, with all actions implemented within 5 years of the license issuance.

The Forest Service includes provisions in condition 41 to address public information and education that are essentially the same as PG&E's proposed provision, except the Forest Service includes brochures as part of the information strategy. The Forest Service does not limit the strategy to NFS lands and includes additional details about the information that would be provided on the information displays and in the educational materials.

California Fish and Wildlife includes provisions in its 10(j) recommendation 16 to address public information and education that are identical to those included in Forest Service condition 41.

PG&E's alternative condition to Forest Service condition 41 removes brochures from the public information and education provision. PG&E notes that brochures frequently become litter at sites or are discarded in the trash.

Our Analysis—Visitors routinely use websites and visitor information boards to acquire information about developed recreation facilities and recreation resources to plan their visits. Providing a public website and signs for these venues that depict recreation resource, water resource, and resource protection information as PG&E proposes and the Forest Service specifies would increase visitor awareness of opportunities available at and near the project. Both PG&E's proposed Recreation Plan and the Forest Service provision would meet this need. Because the project has an extensive footprint and spans multiple land jurisdictions it would be appropriate to consult with all affected agencies to develop the brochure specified by the Forest Service. For the brochure to be useful, it would need to include non-

project information for context and visitor orientation and require significant effort to develop. Although brochures are a useful tool to distribute project information, signs in combination with PG&E's public website would be just as effective and a less expensive method of providing the necessary information to the public without creating additional litter at the project. It would be appropriate periodically to review signage, maps, and public website information.

In addition, development and implementation of an information strategy that includes signs, as proposed by PG&E and specified by the Forest Service, would provide the means for a coordinated and systematic development of signage and interpretative information associated with the project.

Recreational Flows

PG&E proposes several streamflow measures that would enhance whitewater boating opportunities and provide a special event flow at the project. As discussed in section 3.3.2.2, *Aquatic Resources*, PG&E proposes to implement a schedule of flow reductions during spill cessation at Lake Spaulding to minimize flow fluctuations in the South Yuba River (DS-AQR1 Part 7, *Spill Cessation and Minimization of Flow Fluctuations at South Yuba River*). PG&E's proposed measure states that the spill cessation schedule (table 3-182 and table 3-183) is intended to address recreation interests, including boating. In wet, above normal, and below normal water years if the spill flows below Lake Spaulding reach 250 to 420 cfs and the water surface elevation of Lake Spaulding is 5,005.6 or higher, PG&E proposes to provide a target flow once between May 2 and September 30 of 250 to 420 cfs from Lake Spaulding dam. The target flow would be implemented for no less than 6 consecutive days in wet water years, no less than 4 consecutive days in above normal water years, and no less than 2 consecutive days in below normal water years. PG&E would use good faith to implement the target flows prior to or during the Memorial Day weekend.

In addition, as discussed in section 3.3.2.2, *Aquatic Resources*, PG&E proposes to manage discharge from Fordyce Lake after spills cease at Fordyce Lake and Lake Spaulding (DS-AQR1 Part 5, *Fordyce Lake Drawdown*). When Lake Spaulding has ceased spilling (or in a year when Lake Spaulding has not spilled) and as soon as there is sufficient storage space available in Lake Spaulding, PG&E proposes to begin a high target flow of about 475 to 250 cfs that is maintained until storage in Fordyce Lake reaches 29,000 acre-feet. Additionally, PG&E proposes to initiate a special event flow of about 50 cfs for about 10 days beginning at the end of the third week in August.

Forest Service condition 29 and California Fish and Wildlife 10(j) recommendation 2.8 are consistent with PG&E's proposed measure DS-AQR1 Part 7. Forest Service condition 29 and California Fish and Wildlife 10(j) recommendation 2.6 are consistent with PG&E's proposed measure DS-AQR1 Part 5.

The Foothills Water Network supports PG&E measure DS-AQR1 Part 7. The Foothills Water Network comments that this measure would improve whitewater recreation opportunities and, although the measure targets the Yuba Gap reach, the measure would improve boating opportunities for a 40-mile stretch of the river. The Foothills Water Network also supports PG&E measure DS-AQR1 Part 5, but recommends that the forecasted drawdown schedule of Fordyce Lake be publicized.

Our Analysis—Although PG&E does not provide recreation-specific flows, some of its proposed streamflows, discussed in section 3.3.2.2, *Aquatic Resources*, would enhance existing whitewater boating opportunities available at the project. Specifically, one part of the spill cessation schedule (table 3-182 and table 3-183) proposed by PG&E is intended to address recreation interests, including boating. Seven whitewater boating runs in South Yuba River downstream of Lake Spaulding dam were identified during the studies conducted during relicensing. Three boating runs begin upstream of the confluence with Canyon Creek, and boatability is affected primarily by the Drum-Spaulding Project releases from Lake

Spaulding. The other four boating runs begin downstream of the confluence of Canyon Creek and the South Yuba River and are affected by both Yuba-Bear Project and Drum-Spaulding Project releases.

PG&E's proposed streamflows would generally maintain or enhance boating opportunities in the three whitewater boating runs affected primarily by the Drum-Spaulding Project. In the Langs Crossing to Jolly Boys Mine run, PG&E's proposal would substantially increase boating opportunities for hardshell kayaks as compared to the no-action alternative in critically dry and extreme critically dry water year types, and generally maintain boating opportunities in other water year types. In the Jolly Boys Mine to Golden Quartz run, PG&E's proposal would generally maintain boating opportunities for hardshell kayaks as compared to the no-action alternative in all water year types. Although PG&E's proposal would result in fewer boating opportunities for rafts and inflatable kayaks in wet water year types in this run (about 5 total days from March through July), it would generally maintain boating opportunities for rafts and inflatable kayaks in most water year types. In the Golden Quartz to Washington run, PG&E's proposal would generally maintain boating opportunities for hardshell kayaks and rafts as compared to the no-action alternative in most water year types, except for wet water year types when the no-action alternative would result in substantially increased boating opportunities (about 14 days). However, PG&E's proposal would substantially increase boating opportunities in this reach as compared to the no-action alternative for inflatable kayaks in all water year types (ranging from about 7 to 22 days, depending on the water year type).

PG&E's proposed streamflows, in conjunction with NID's proposed streamflows, would generally maintain or enhance boating opportunities in the four whitewater boating runs downstream of the confluence of Canyon Creek and the South Yuba River, which are affected by releases from both the Drum-Spaulding Project and the Yuba-Bear Project. As compared to the no-action alternative, PG&E's and NID's proposed streamflows in the Washington to Edwards Crossing run would generally maintain or provide a few additional days of boating opportunities for most boat types in most water year types, except boating opportunities would be substantially increased for hardshell kayaks and inflatable kayaks in critically dry and extreme critically dry water year types, and substantially decreased for hardshell kayaks and rafts in wet water year types. In the Edwards Crossing to Purdon Crossing run, PG&E's and NID's proposed streamflows would substantially increase boating opportunities for all boat types in most water year types, as compared to the no-action alternative. PG&E's and NID's proposed streamflows would result in a substantial decrease in boating opportunities for hardshell kayaks in wet water year types, and generally maintain opportunities for inflatable kayaks in wet water year types and for hardshell kayaks and rafts in dry and above normal water year types.

PG&E's proposed streamflows, in conjunction with NID's proposed streamflows, would substantially increase boating opportunities in the Purdon Crossing to Highway 49 run for hardshell kayaks, as compared to the no-action alternative, except boating opportunities would be substantially decreased for hardshell kayaks in wet water year types and generally maintained for hardshell kayaks in below normal water year types. In the Purdon Crossing to Highway 49 run, PG&E's and NID's proposed streamflows would generally substantially increase or maintain boating opportunities for rafts, except for a substantial decrease in wet water year types. In the Highway 49 to Bridgeport run, PG&E's and NID's proposed streamflows would substantially increase boating opportunities for hardshell kayaks in most water year types, as compared to the no-action alternative, except boating opportunities would generally be maintained for hardshell kayaks in below normal and wet water year types. In the Highway 49 to Bridgeport run, PG&E's and NID's proposed streamflows would generally maintain boating opportunities for rafts in all water year types, except for critically dry and extreme critically dry water years.

PG&E's proposal to manage discharge from Fordyce Lake would result in high water releases early in the year and lower flows by the end of the summer. Fordyce Creek below Fordyce Lake dam was

identified as a whitewater boating run during the studies conducted during relicensing. PG&E's proposal would substantially increase whitewater boating opportunities in Fordyce Creek compared to the no-action alternative for all watercraft types, particularly during the month of June. PG&E's proposal would increase boating opportunities for kayaks in all water year types and would increase boating opportunities for rafts in all water year types, except for above normal water years, where boating opportunities for rafts would be maintained as compared to the no-action alternative.

The Foothills Water Network's recommendation for PG&E to publicize the forecasted drawdown schedule of Fordyce Lake would allow boaters to take advantage of suitable boating flows provided by the project. Although PG&E notes that its measure was intended to provide the needed operational flexibility without the need for an annual flow schedule, providing advance notice, when possible, to the public of the drawdown would allow boaters to better plan and take advantage of the boating flows provided in Fordyce Creek.

PG&E's proposed 10-day special event flow near the end of August would provide increased recreational opportunity for OHV users. This special event flow would allow for OHV use of the Fordyce OHV Trail to cross Fordyce Creek.

Recreation Flow Information

PG&E proposes to make average daily streamflow information available to the public via the internet (may be accomplished through a third party) from May 1 through November 30 (measure DS-RR2, *Provide Recreation Flow Information*). PG&E proposes to provide streamflow information for the South Yuba River at Cisco (above Lake Spaulding), Fordyce Creek (below Lake Fordyce), the South Yuba River (below Lake Spaulding Dam), Bear River (at Highway 20), and Bear River (below Drum afterbay).

The Foothills Water Network recommends that PG&E continue current, year-round gage operations at existing streamflow gages. Annual flow information taken at historic locations is important for scientific purposes and promoting understanding of the watershed, and is also utilized by numerous types of recreationists, including whitewater boaters and anglers. The Foothills Water Network also recommends that a gage be added below the confluence of Canyon Creek on the South Fork Yuba River to allow the public to see the combined effect of flow measures on these reaches.

In its reply to the Foothills Water Network's comments regarding providing year-round recreation flow information via the internet, PG&E reported that it currently already provides much of the information recommended by the Foothills Water Network and would continue to provide this information for the South Yuba River at Cisco (above Lake Spaulding), Fordyce Creek (below Lake Fordyce), the South Yuba River (below Lake Spaulding dam), Bear River (at Highway 20), and Bear River (below Drum afterbay).

Our Analysis—Providing year-round average daily streamflow data on the internet for five stream reaches, as PG&E proposes, would allow boaters to take advantage of suitable boating flows provided by the project. Providing the year-round average daily streamflow data on a single, public website would provide the public with a single website to obtain recreation-related information for the project. Because the streamflows are affected by special events, reservoir spill, and outages, providing as much advance notice of these occurrences, their duration, and expected travel time for flows would increase whitewater boating opportunities. The location for a new gage recommended by the Foothills Water Network would be 8.5 miles downstream of the project facilities, and flows at this location are influenced by factors beyond the control of PG&E. The public can determine recreation opportunities in this stretch of the South Fork Yuba River through trends from flow information available from NID on the South Yuba

River just below Lake Spaulding dam and from information available from NID on Canyon Creek below Bowman dam.

Purdon and Edwards Crossing

BLM specifies that PG&E enter into a recreation, operation, and maintenance agreement to establish the process for constructing a vault toilet at Purdon Crossing, a kiosk at Purdon and Edwards Crossing, an 8-foot-wide path leading from the river to the trailhead or parking area of Edwards and Purdon Crossing, and replacement of the vault toilet at Edwards Crossing in approximately 10-15 years. BLM further specifies that PG&E provide \$30,000 annually with adjusted Gross Domestic Product-Implicit Price Deflator (GDP-IDP) for operation, maintenance, law enforcement patrolling, and administration of this area. The BLM states in its rationale provided with condition 6 that the South Yuba diversion has caused the river to be lower in the spring and summer months causing these lands along the South Yuba River, including Edwards and Purdon Crossing, to be heavily impacted by recreational uses for hiking, swimming, and day-use activity. BLM is working with PG&E to develop a separate agreement that address this condition and once the agreement is finalized, BLM states the condition would be removed.

Our Analysis—The Edwards and Purdon Crossing area is located outside the project boundary over 25 miles downstream. Further, this area does not serve a project purpose nor does it provide access to project facilities. Although providing facilities at Edwards and Purdon Crossing would provide benefit to recreation users downstream, there does not appear to be a nexus between this area and the project. Therefore, it would not be appropriate to require PG&E to provide annual funding for the facilities related to this area.

Yuba-Bear Project

Fish Stocking

One of the primary recreational activities associated with the project includes angling. California Fish and Wildlife currently stocks several project reservoirs to improve the recreational fishery. NID proposes to pay California Fish and Wildlife annually for the stocking of up to 20,000 trout fry and 25,000 kokanee fry in Bowman Lake and the stocking of up to 10,000 catchable rainbow trout, 10,000 catchable brown trout, and 25,000 kokanee fry in Rollins reservoir. Payments would not exceed the then-prevailing statewide average cost to California Fish and Wildlife, without mark-up, for the production and stocking of trout and kokanee fry in similar reservoirs. NID's proposed measure includes provisions for California Fish and Wildlife, at its sole discretion, to change the number, species, and size of fish stocked in Bowman Lake and Rollins reservoir in any one year, but NID would only be responsible for reimbursing California Fish and Wildlife for the levels of stocked trout and kokanee fry proposed in NID's measures.

California Fish and Wildlife recommends in recommendation 17 and the Forest Service recommends in its 10(a) recommendation 9 that NID fund the stocking of fish in Bowman, Faucherie, French, and Sawmill Lakes, and Jackson Meadows and Rollins reservoirs on an annual basis. Fish species and size class stocking targets would be determined by California Fish and Wildlife. However, California Fish and Wildlife and the Forest Service recommend a maximum number of fingerings and/or catchable fish that would be stocked in each of the six reservoirs and annual consultation with California Fish and Wildlife to select fish species, obtain fish stocking targets, discuss fish acquisition, and verify the completion of the previous year's stocking commitment. California Fish and Wildlife and the Forest Service recommend that NID, at its discretion, would: (1) acquire the fish directly from approved fish hatcheries, or (2) reimburse California Fish and Wildlife for the cost of the stocking program.

In a response letter dated September 14, 2012, to California Fish and Wildlife and Forest Service, NID states it would be appropriate to reimburse California Fish and Wildlife for the annual fish stocking in Jackson Meadows, Bowman, and Rollins reservoirs up to the maximum levels included in the agencies' recommendations; however, stocking in French, Faucherie, and Sawmill Lakes should occur no more than once every 3 years. NID also notes that it should not be responsible for the act of stocking since that responsibility is mandated to California Fish and Wildlife by California law.

Our Analysis—Angling is one of the most popular activities associated with the project, and stocking fish in project reservoirs would help ensure that the recreational fishery is maintained for the term of the new license. Based on recreation studies completed during the relicensing process, the demand for angling at the project is projected to increase approximately 23 percent over the term of a new license. Maintaining the existing stocking numbers in those reservoirs that receive high recreational use and high angling pressure would help meet the estimated future demand for angling at the project for the term of the a new license.

Rollins and Jackson Meadows reservoirs receive very high recreational use and high angling pressure. Faucherie and Bowman Lakes receive a moderate amount of recreational use with a little over half of the visitors participating in angling at Faucherie Lake and approximately half of the visitors at Bowman Lake. Although fish stocking at Faucherie Lake would be aerial due to the remote area, periodic fish stocking may be appropriate for this reservoir given the moderately high recreational use. The existing frequency that California Fish and Wildlife stocks this reservoir is unclear. NID notes that California Fish and Wildlife stocked French, Faucherie, and Sawmill Lakes less than half the time from 2002 to 2009, and infrequently before 2002. Sawmill and French Lakes are also remote, high altitude reservoirs that would require aerial fish stocking. French Lake received very low recreational use, and although Sawmill Lake received a moderate level of recreational use, anglers only comprised one-third of those visitors.

Developing a fish stocking plan that would address fish stocking in Rollins and Jackson Meadows reservoirs, and Bowman and Faucherie Lakes and address stocking fish in additional reservoirs based on changes in recreational use and angling pressure, which would include annual consultation with California Fish and Wildlife to determine fish species, stocking numbers and sizes, and reservoirs to be stocked in that year, would provide the means for a coordinated fish stocking program with the flexibility to increase or decrease stocking numbers, change fish stocking sizes, and change the frequency of stocking a particular reservoir over the term of a new license. A fish stocking plan that also includes annual consultation would help address any changes in California Fish and Wildlife fish stocking management targets and the availability of hatchery fish.

Although the responsibility of fish stocking is mandated to California Fish and Wildlife by California law, we note that NID is ultimately responsible for the management of all project reservoirs and project reaches and would be responsible for the stocking of fish if required under a new license.

Recreation Plan

This section evaluates the environmental effects of the Amended Recreation Facilities Plan filed by NID as part of the amended license application in June 2012 (Recreation Plan), Forest Service condition 41, California Fish and Wildlife 10(j) recommendation 17, BLM's 10(j) and 10(a) recommendations, and the proposed alternative conditions Recreation Plan filed by NID in August 2012 (Alternative Recreation Plan).

NID proposes to implement the Recreation Plan as filed with its amended license application (NID, 2011a). The proposed plan would: (1) provide recreation facilities that meet the needs of project-related recreation and area consistent with federal, state, and local legal requirements; (2) monitor

recreation use over the term of the license to help project-related recreation users achieve quality recreation experiences while minimizing recreation use effects; (3) and enhance the accessibility of project-related recreation facilities for visitors with disabilities. The proposed plan includes a number of provisions for improvements and upgrades at existing recreation facilities and measures to construct new facilities. Proposed modifications to existing facilities and proposed new developments are summarized in table 3-226. On August 29, 2012, NID filed its response to Forest Service condition 41 in the form of alternative conditions to be included in its Recreation Plan (Alternative Recreation Plan). Some of NID's proposed alternative conditions are similar to the Forest Service condition 41 provisions. However, in cases where NID provided no alternative, our analysis relies on the proposals made in the amended (June 2012) Recreation Plan.

Forest Service condition 41 specifies that NID consult with the Forest Service to finalize the proposed Recreation Plan and submit it for Forest Service approval. The Forest Service specifies that once the Recreation Plan is complete, it will be included as part of condition 41. Forest Service condition 41 specifies 4(e) conditions for facilities on NFS lands and recommends 10(a) recommendations for facilities on NID lands.

Although BLM does not specify the development of a recreation plan, BLM does specify several 4(e) conditions related to specific recreation facilities (conditions 33 and 34 for Dutch Flat afterbay and Chicago Park powerhouse, respectively) and recommends 10(a) recommendation 1 for the Bear River trail.

California Fish and Wildlife recommends in its 10(j) recommendation 17 that NID consult with the Forest Service and BLM to finalize the proposed Recreation Plan and submit it for Forest Service and BLM approval. California Fish and Wildlife recommends that once the Recreation Plan is complete, it will be included as part of the condition.

Table 3-226 summarizes notable differences between the recreation facilities in the proposed Recreation Plan and the recreation facility provisions included in Forest Service condition 41. Generally, California Fish and Wildlife's recommendation 17 is identical or almost identical to Forest Service condition 41; however, California Fish and Wildlife's recommendation includes several recreation facility provisions that were in the original Forest Service conditions but were removed from the revised Forest Service conditions.

We analyze specific provisions in the proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM 4(e) conditions and 10(a) recommendations, and California Fish and Wildlife's 10(j) recommendation 17 in the following areas: (1) recreation plan implementation; (2) facility construction and modification; (3) trails and access developments; (4) host sites; (5) recreation facility operation and maintenance; (6) water system developments; (7) recreation monitoring; (8) recreation development review; (9) project patrols/law enforcement; (10) public information and education; and (11) boat ramp extensions.

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Jackson Meadows Reservoir				
<ul style="list-style-type: none"> • Install animal-resistant food lockers. 	NA	NA	NA	NA
<i>East Meadow Campground</i>				
<ul style="list-style-type: none"> • Construct/maintain a pedestrian trail and upgrade host campsite to include septic/holding tank. 	<ul style="list-style-type: none"> • Construct/maintain pedestrian trail and upgrade septic or holding tank within 5 years. 	<ul style="list-style-type: none"> • Same as Forest Service 	NA	<ul style="list-style-type: none"> • Same as Forest Service
<ul style="list-style-type: none"> • Replace at least 1 flush restroom with vault restroom. 	<ul style="list-style-type: none"> • Convert the two-unit flush toilet to a two-unit vault toilet within 5 years. 	<ul style="list-style-type: none"> • Same as Forest Service 		
<ul style="list-style-type: none"> • Expand and gravel the existing parking area to at least 25 by 60 feet. 	<ul style="list-style-type: none"> • Expand the existing parking areas to 15-25 feet by 60 feet and provide gravel surfacing and install a second parking area with gravel surface, 30 feet by 60 feet within 5 years. 	<ul style="list-style-type: none"> • Same as Forest Service 		
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Lengthen/widen spurs and rehabilitate/reconstruct road within 15 years. 	<ul style="list-style-type: none"> • No comparable provision 		
<i>Pass Creek Campground</i>				
<ul style="list-style-type: none"> • Upgrade host campsite to include septic and hydrant for water. 	<ul style="list-style-type: none"> • Upgrade host site within 8 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • Replace flush restroom buildings with vault models. • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Replace flush toilet buildings with fully accessible flush toilets within 8 years. • Provide additional vehicle and trailer parking; lengthen and widen spurs (5 spurs that are 16 feet and 11 spurs that are 13 feet wide) within 15 years. • Replace or rehabilitate vault toilets within 15 years. 			
<i>Pass Creek Overflow</i>				
<ul style="list-style-type: none"> • Install 1-unit vault restroom; provide additional boat launch parking; and install removable site markers at campsites. • No comparable provision 	<ul style="list-style-type: none"> • Same as Recreation Plan, within 5 years • Provide picnic tables and fire rings around the edge of the parking area within 5 years. 	<ul style="list-style-type: none"> • Provide additional boat launch parking. 	NA	<ul style="list-style-type: none"> • Same as Forest Service
<i>Pass Creek Boat Launch</i>				
<ul style="list-style-type: none"> • Construct/maintain an accessible trail on the shoreline. 	<ul style="list-style-type: none"> • Provide 21 additional parking spaces, accessible parking, and 6 RV overflow parking spaces within 5 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Provide asphalt treatment on the high water launch; replace wooden barriers with boulders; provide more prominent signing regarding submerged stumps and rocks within 1 year. 	<ul style="list-style-type: none"> • No comparable provision 		
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Same as the Recreation Plan to be completed within 5 years 	<ul style="list-style-type: none"> • Provide at least one additional accessible parking space within 8 years. 		
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Provide low-water boat launching access below the constructed ramp within 5 years. 	<ul style="list-style-type: none"> • Same as Forest Service during critically dry water years only 		
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Reconstruct boat ramp and replace toilet within 15 years. 	<ul style="list-style-type: none"> • No comparable provision 		
<i>Aspen Group Campground</i>				
<ul style="list-style-type: none"> • Construct a pedestrian trail. 	<ul style="list-style-type: none"> • No comparable provision 	NA	NA	<ul style="list-style-type: none"> • Same as Forest Service
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Improve barrier to prevent off-road use and mark accessible parking within 2 years.^a 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Reconstruct campground; improve barriers to prevent off-road use; and expand parking areas within 10 years.^a 			
<i>Aspen Picnic Area</i>				
<ul style="list-style-type: none"> Replace the 4-unit vault restroom with 2-unit accessible vault restroom; and develop 2 additional accessible picnic sites. 	<ul style="list-style-type: none"> Same as Recreation Plan but completed within 5 years 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Construct a non-motorized trail and designate accessible parking within 5 years. 	<ul style="list-style-type: none"> Same as Forest Service 		
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Reconstruct road and review appropriate number of sites based on demand. 	<ul style="list-style-type: none"> No comparable provision 		
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Reduce number of sites by demand within 10 years 	<ul style="list-style-type: none"> No comparable provision 		
<i>Fir Top Campground</i>				
<ul style="list-style-type: none"> Replace flush restroom buildings with vault models. 	<ul style="list-style-type: none"> Add a single unit vault toilet within 10 years. 	<ul style="list-style-type: none"> Same as Recreation Plan; unless reliable water source established, keep the flush toilets. 	NA	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Rehabilitate/reconstruct road; lengthen/widen spurs within 10 years. • Construct and maintain pedestrian native surface trails within 10 years. 	<ul style="list-style-type: none"> • Same as Forest Service • No comparable provision 		
<i>Findley Campground</i>				
<ul style="list-style-type: none"> • Replace flush restroom buildings with vault models. • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Replace flush toilet with accessible toilet within 10 years. • Repair sufficiently damaged roads and replace water source within 3 years. • Reconstruct campground with replacing retaining walls; providing additional trailer and vehicle parking; and reconstructing and widening circulation road within 10 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan; unless reliable water source established, keep the flush toilets. • No comparable provision • No comparable provision 	NA	<ul style="list-style-type: none"> • Same as Forest Service
<i>Woodcamp Campground</i>				
<ul style="list-style-type: none"> • Replace flush restroom buildings with vault models. 	<ul style="list-style-type: none"> • Replace 1 wooden vault toilet with accessible vault toilet within 3 years.^a 	<ul style="list-style-type: none"> • Same as Recreation Plan; unless reliable water source established, keep the flush toilets. 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • Upgrade host campsite to include septic/holding tank/leach system and hydrant for water hook-up. • No comparable provision 	<ul style="list-style-type: none"> • Upgrade the host site to include septic within 10 years. • Lengthen/widen spurs; reconstruct road; provide additional parking within 10 years. 			
<i>Woodcamp Boat Launch</i>				
<ul style="list-style-type: none"> • Upgrade boat launch including replacing the launch ramp. • Pave parking area; widen and repave the facility circulation road; and replace the existing restroom building. 	<ul style="list-style-type: none"> • Upgrade to 2-lane launch ramp with an accessible courtesy dock and sidewalk within 5 years. • Same provision to be completed within 5 years 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service
<i>Woodcamp Picnic Area</i>				
<ul style="list-style-type: none"> • Develop parking and unloading area. 	<ul style="list-style-type: none"> • Reconstruct the road within 5 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> Develop accessible picnic units and replace the existing restroom building with a 2-unit vault restroom building. 	<ul style="list-style-type: none"> Same provision to be completed within 5 years 			
<i>Silvertip Group Campground</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Within 5 years, replace unit marker; replace information signs; provide accessible routes in both group sites; widen trail; regrade campsite areas; reconstruct interior campground roads and parking area (10 additional spaces); replace wooden tables.^a 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Reconstruct campground within 20 years.^a 			
<i>Woodcamp Complex Trail System</i>				
<ul style="list-style-type: none"> Construct pedestrian trails. 	<ul style="list-style-type: none"> Maintain trail annually. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> Install trail and trailhead signage. 	<ul style="list-style-type: none"> Install a more-prominent trailhead sign and interpretive signs within 5 years. 			
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Improve parking area within 5 years. 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<i>Jackson Point Boat-In campground</i>				
<ul style="list-style-type: none"> Relocate boat-in campsites and remove up to 4 campsites. Install animal-resistant food lockers at each relocated campsite. Remove existing pit toilets. 	<ul style="list-style-type: none"> Relocate sites that are currently not being used and remove unused facilities within 2 years. Same provision to be completed within 2 years Replace 2 toilets within 2 years 	<ul style="list-style-type: none"> Same as Recreation Plan Same as Recreation Plan, also including fire rings and tables Same as Forest Service 	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Group Campgrounds Construction</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Construct group campground (at least 50 PAOT) facilities with potable water within 4 years. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Family Campgrounds Construction</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Construct a minimum of 20 additional family campsites with potable water within 8 years. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Jackson Meadows Reservoir – Administration Center</i>				
<ul style="list-style-type: none"> Remove administration center from project boundary. No comparable provision 	<ul style="list-style-type: none"> If not used, demolish administrative facility, and/or remove some or all of the facilities and revegetate the site. Demolish barracks and revegetate sites; and provide landlord type maintenance. 	<ul style="list-style-type: none"> Same as Forest Service No comparable provision 	NA	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Within 2 years of license issuance, conduct sanitary surveys of all septic tanks and disposal fields. 	<ul style="list-style-type: none"> No comparable provision 		
<i>Jackson Sanitary Dump Station</i>				
<ul style="list-style-type: none"> Improve efficiency of facility. 	<ul style="list-style-type: none"> Construct dump station with a leach field, potable water, and an RV filling station. 	<ul style="list-style-type: none"> Same as Recreation Plan; unless effort to improve fails, follow Forest Service's provisions. 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> Reserves right to decommission facility if it receives low levels of use to justify expense. 	<ul style="list-style-type: none"> Retrofit riser within 2 years.^a 			
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Consider alternative uses for the site in the Recreation Plan, to be constructed as needed when the dump station is decommissioned.^a 			
<i>Jackson Meadows Vista</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Gravel the parking area within 5 years. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Rehabilitate or replace restroom building within 15 years. 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<i>Jackson Meadows Area – Additional Trail Construction</i>				
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Install and maintain trailhead and directional signing on all trails in the Jackson Meadows area within 5 years. 	NA	NA	<ul style="list-style-type: none"> • Same as Forest Service
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Construct and maintain a non-motorized trail from Vista Point and Aspen group campground to a lake overlook within 5 years. 			
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Construct and maintain a new non-motorized trail from the Woodcamp Complex to English dam; if not feasible to connect with the Woodcamp Interpretive Trail, provide trailhead facilities within 15 years. 			
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Provide annual maintenance of these trails. 			
<i>Jackson Meadows Development Plan</i>				
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Develop plan for facility expansion that is approved by Forest Service within 1 year. 	NA	NA	<ul style="list-style-type: none"> • Same as Forest Service
Milton Diversion Impoundment				
<i>Day-Use Area</i>				
<ul style="list-style-type: none"> • Develop shoreline day-use area with parking area. 	<ul style="list-style-type: none"> • Create parking spaces within 3 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> Develop hand launch. 	<ul style="list-style-type: none"> Limit shoreline access to one car-top boat launch with barriers. 			
<i>Primitive Campsites</i>				
<ul style="list-style-type: none"> Develop six primitive, walk-in campsites with designated parking space. No comparable provision 	<ul style="list-style-type: none"> Develop three primitive site near boat launch and three primitive sites west of the boat launch area Determine need for food lockers each year. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Jackson Creek Campground</i>				
<ul style="list-style-type: none"> No comparable provision No comparable provision No comparable provision 	<ul style="list-style-type: none"> Maintain the 3-panel sign. Redesign and reconstruct as a campground within 10 years. Replace double-unit toilet with two single-unit accessible toilets. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
French Lake				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Grade and gravel the existing parking area and install large rock barriers to keep OHVs from accessing lake within 5 years. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>French Lake Trail</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Install and maintain trailhead sign within 5 years. 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Bowman Lake				
<ul style="list-style-type: none"> • Designate and appropriately sign the reservoir for day use and camping in designated sites only. • Dismantle all dispersed, non-designated campsites on the north shoreline. • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Same provision within 2 years • No comparable provision • Prepare a corridor-wide recreation development and management plan for the Bowman Recreation Corridor in consultation with the Forest Service within 2 years. • Provide minimum of one potable water system at one of the campgrounds in the Bowman Recreation Corridor within 5 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service
<i>Designated Primitive Campsites</i>				
<ul style="list-style-type: none"> • Designate up to 10 primitive campsites along the shoreline. 	<ul style="list-style-type: none"> • Eliminate all dispersed primitive campsites and restrict all camping to formal campground facilities within 5 years. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<i>Inflow Day-Use Area</i>				
<ul style="list-style-type: none"> Develop a gravel parking area for up to 10 vehicles with vehicle barriers and a 2-panel information board. 	<ul style="list-style-type: none"> Provide 3-5 vehicle parking spaces within 2 years. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Campground</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Expand camping by 20 sites on NFS land within 5 years. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Rehabilitate the existing facilities at Bowman campground within 5 years.^a 			
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Limit camping to developed campgrounds and designated sites only within 7 years.^a 			
<i>Shoreline Access Road (Informal Boat Ramp)</i>				
<ul style="list-style-type: none"> Install gate at top of the road/informal boat ramp to prevent vehicles from using the ramp. 	<ul style="list-style-type: none"> Install gate at informal boat ramp within 2 years but allow people to carry their watercraft to launch. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> Inform visitors of the formal boat ramp at the east end of the reservoir at Bowman Lake campground. 	<ul style="list-style-type: none"> Install signs to formal boat ramp within 2 years. 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • Dismantle all dispersed campsites. 	<ul style="list-style-type: none"> • No comparable provision 			
Bowman Recreation Corridor Trail Development				
<ul style="list-style-type: none"> • No comparable provision 	<ul style="list-style-type: none"> • Within 2 years construct and maintain one of the following: <ul style="list-style-type: none"> ○ at or near Sawmill Lake, construct a pedestrian bridge crossing over Canyon Creek; ○ a walkway across Sawmill Spillway; ○ a trail from the family and group campgrounds connected to the Grouse Ridge Trail on the south side of Sawmill Lake; or ○ a primitive trail from Faucherie to Sawmill Lake. 	NA	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
	<ul style="list-style-type: none"> French Lake Trail – Construct and maintain one of the following: <ul style="list-style-type: none"> primitive trail from Faucherie Lake to French Lake; or primitive trail from Forest Service 843-37 Road to French Lake. Create a trailhead with parking for 6-10 vehicles near the start of the trail. Ensure perpetual public right to use the trails on licensee land; provide directional signs at trail entry points; provide annual maintenance on trails. 			
Sawmill Lake				
<ul style="list-style-type: none"> Designate and appropriately sign the reservoir for day use and camping in designated sites only, except on the south shoreline where boat-in and hike-in dispersed camping would be permitted. 	<ul style="list-style-type: none"> Post designated signage at vehicle access points. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> Dismantle all dispersed campsites on the north shoreline. 	<ul style="list-style-type: none"> Dismantle all dispersed campsites not incorporated and converted into developed campsites. 			
<i>Dam Day-Use Area</i>				
<ul style="list-style-type: none"> Convert and sign the site for day use only; remove all dispersed campsites; and install a 2-panel information board. 	<ul style="list-style-type: none"> Install information kiosk.^a 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Sawmill Lake Family Campground (NID Land)</i>				
<ul style="list-style-type: none"> Develop a rustic, 10-unit family campground (25 PAOT) with parking areas for 10 vehicles, a vault restroom, and a hand launch. 	<ul style="list-style-type: none"> Construct a 15-20 unit family campground, parking, and 1 vault toilet per 35 PAOT; provide signs to informal boat launch opportunity at the dam. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<i>Sawmill Lake Group Campground (NFS Land)</i>				
<ul style="list-style-type: none"> Develop a rustic group campground (25 PAOT) with a native surface parking areas for 10 vehicles with barriers, a 1-unit vault restroom, and a hand launch facility. 	<ul style="list-style-type: none"> Construct a group campground (25 PAOT) with barricade roadway and parking; vault toilet and barrier existing informal boat ramp to allow only car-top launching within 5 years. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Canyon Creek				
<i>Canyon Creek Campground</i>				
<ul style="list-style-type: none"> • Install animal-resistant food lockers at campsites. • No comparable provision • No comparable provision • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Provide large food lockers for each site and 4 lockers for the 25 PAOT group camp within 5 years. • Reconstruct campground and make accessible; redesign and convert the west end of the campground into a minimum of a 25 PAOT group site. • Replace the two restrooms with new walkway. • Provide an information/interpretive display. • Provide road surface treatment of all interior campground roads and spurs. 	<ul style="list-style-type: none"> • Same as Recreation Plan 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Same as Forest Service
<i>Canyon Creek Dispersed Sites</i>				
<ul style="list-style-type: none"> • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Within 5 years create a 10-15 unit campground; incorporate the existing dispersed campsites; develop 4-7 additional campsites along Canyon Creek. • Install 2 vault toilets within 5 years. 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Same as Forest Service

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NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> • No comparable provision • No comparable provision • No comparable provision 	<ul style="list-style-type: none"> • Use existing spurs off main road as “campsite” spurs and create new spurs for new sites. • Install a self-service pay station if NID wishes to recover some of the operating costs. • Remove and restore remaining dispersed sites along Canyon Creek not at the campground within 5 years. 			
Faucherie Lake				
<i>Faucherie Lake Day-Use and Boat Ramp</i>				
<ul style="list-style-type: none"> • Install barriers at the launch to provide hand launching only. • Work with Nevada County for non-motorized boating uses only designation. • No comparable provision 	<ul style="list-style-type: none"> • Rehabilitate informal boat ramp, block at high water mark and sign for car-top launch only; designate load/unloading parking spaces within 10 years.^a • Add an information kiosk within 5 years. • Provide vegetative screening between the 2 group units or move units farther apart, if feasible, within 10 years.^a 	<ul style="list-style-type: none"> • Same as Recreation Plan 	NA	<ul style="list-style-type: none"> • Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Replace the toilet at the day-use area within 5 years. 			
<i>Faucherie Group Campground</i>				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Replace the toilets and picnic tables within 5 years.^a 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Expand parking; sign van accessible parking space within 5 years.^a 			
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Rehabilitate the remainder of the group campground facilities within 10 years. 			
<i>Faucherie Lake Dam Parking Area</i>				
<ul style="list-style-type: none"> Install a gate at the dam access road 	<ul style="list-style-type: none"> Place gate on the west end of the dam within 2 years. 	<ul style="list-style-type: none"> Same as Recreation Plan 	NA	<ul style="list-style-type: none"> Same as Forest Service
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Provide signage and trailhead with information board within 5 years. 			
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Rehabilitate day-use parking area and circulation road within 10 years. 			

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Dutch Flat Afterbay				
<i>Dutch Flat Afterbay Day-Use Area</i>				
<ul style="list-style-type: none"> Develop a day-use area along the shoreline if suitable land is found. 	<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Same as Recreation Plan 	Condition 33: Within 90 days of license issuance, make a good faith effort to purchase at fair market value parcel of interest or obtain lease or easement for property for day-use facility; if unsuccessful, provide a good faith effort to work out an agreement with PG&E, to develop a day-use area on PG&E property.	<ul style="list-style-type: none"> Develop a day-use area along the shoreline if suitable land is found.
Langs Crossing				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Providing additional facilities (vault toilet, parking area, picnic site, trash containers) on NFS lands adjacent to Bowman Road to Langs Crossing within 5 years. 	NA	NA	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID's Proposed Recreation Plan, Forest Service condition 41, NID's Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Bear River Trail				
<ul style="list-style-type: none"> No comparable provision 	<ul style="list-style-type: none"> Cooperate with trail planners for trail along Bear River; provide perpetual public access of trail and roads across NID lands; support trailhead development, sanitation, and signage.^a 	NA	10(a) Recommendation 1: Within 5 years, cooperate with trail planners for trail along Bear River; provide perpetual public access of trail and roads across NID lands; support trailhead development, sanitation, and signage.	<ul style="list-style-type: none"> Same as Forest Service

Table 3-226. Notable facility differences between the provisions of NID’s Proposed Recreation Plan, Forest Service condition 41, NID’s Alternative Recreation Plan, BLM conditions and recommendations, and California Fish and Wildlife recommendation 17. (Source: staff)

NID Proposed Recreation Plan	Forest Service Condition 41 Recreation Plan Provisions	NID Alternative Recreation Plan	BLM 4(e) Conditions and 10(a) Recommendations	California Fish and Wildlife 10(j) Recommendations
Chicago Park Powerhouse				
• No comparable provision	• No comparable provision	• No comparable provision	Condition 34: Within 1 year of license issuance, sign an assistance agreement with BLM and develop a rehabilitation plan with BLM to block, gate, and rehabilitate roads and trails; NID provides the manpower, equipment, and materials; meet with BLM by November 15th of each year to discuss following year’s projects.	• No comparable provision

^a Forest Service condition 41 specifies these provisions as 10(a) recommendations because the facilities are not on NFS lands.

Recreation Plan Implementation and Organization

NID’s proposed Recreation Plan is similar to the plan outlined in Forest Service condition 41 and California Fish and Wildlife condition 16. Where differences do exist between the proposed plan and specifications made in the Forest Service condition, the differences are mostly related to detailed facility configuration or the schedule for completion.

Our Analysis—NID’s proposed Recreation Plan would provide benefits to the public generally within 1-6 years. In some specific instances, the Forest Service has specified a shorter or longer time frame for completion of a particular facility modification or addition, but in most instances, the

differences in timing are within a year or two. In some of these instances, existing recreational use data suggest that completion of a facility modification or addition should occur sooner or later than specifically proposed by NID in the plan. However, taken as a whole, the implementation of the proposed plan with all of the facility modifications and enhancements included would be of great benefit to the recreating public and is generally consistent with the plan components specified by both the Forest Service and California Fish and Wildlife.

Recreation Plan Facility Construction and Modification

NID's Recreation Plan and Alternative Recreation Plan propose a number of upgrades, additions, modifications, and reductions to existing facilities to enhance recreational use of the project. The proposed modifications are listed in table 3-227. Most of the measures proposed are modifications to existing facilities, but under the proposed Recreation Plan, NID proposes to construct several new recreation facilities as well. In the following section, we analyze by recreation area the more significant recreation facility proposals included in NID's proposed plan, including: (1) animal-resistant locker additions; (2) accessible facility additions or modifications; (3) campground or campsite additions or modifications, including the addition of campsites or campgrounds to alleviate crowding, and the formalization of dispersed campsites; (4) road, parking, and vehicle barrier additions or modifications; and (5) trail and trailhead additions or modifications.

Animal-Resistant Food Lockers

Currently, not all campgrounds and campsites located at the NID recreation sites are equipped with food lockers. As part of its proposed Recreation Plan, NID proposes to install animal-resistant food lockers at campgrounds and campsites located throughout the project where they do not currently exist, including campsites at the Jackson Meadows reservoir recreation area, the Jackson Point boat-in campground, and the Canyon Creek campground. Forest Service condition 41 specifies the installation of animal-resistant food lockers at these same campground and campsite locations, and in addition specifies that the need for animal-resistant food lockers at the Milton diversion impoundment should be evaluated each year. None of the other agencies provided specifications or recommendations regarding animal-resistant food lockers.

Our Analysis—Installation of animal-resistant food lockers, as proposed, would have little or no adverse impact on the recreation sites, or on project resources, and would be a benefit to recreation users. Animal-resistant food lockers at all campsites would discourage wildlife from frequenting campsites, significantly reduce the potential for human-wildlife interactions, and improve camper safety. Installation of animal-resistant food lockers at all campsites, including dispersed primitive campsites, such as those located at the Milton diversion impoundment would benefit both recreationists and wildlife.

Accessible Facilities

Currently, not all of the NID recreation sites are equipped with accessible recreation facilities for those visitors with disabilities. To improve accessibility, as part of its proposed Recreation Plan, NID proposes to add a number of improvements at the project's existing recreation sites, including and accessible trail and picnic sites. Table 3-226 provides a detailed summary of accessibility improvement proposals. In addition to these proposed measures, Forest Service condition 41 specifies additional accessibility improvements at several sites, including: Aspen picnic area, Findley campground, Woodcamp campground, Woodcamp boat launch, Silvertip group campground, and Canyon Creek campground (see table 3-226 for specific details). In the NID alternative recreation plan, NID proposes similar accessibility improvements to those specified by the Forest Service at the Aspen picnic area. Without exception, California Fish and Wildlife's recommendations regarding accessible facilities are the same as the Forest Service specifications.

Our Analysis—The provision of accessible recreation facilities is consistent with the Commission’s policy under which licensees are expected to consider the needs of all populations, including those with disabilities, in the design and construction of such facilities. Providing accessible facilities, where feasible, would benefit all recreation users by improving access and would help address growing recreational demand at this project. Additional accessibility improvements specified by the Forest Service and recommended by California Fish and Wildlife would further enhance recreation accessibility at the project and would give disabled visitors even more access to the project and greater opportunities to participate in many of the recreational opportunities provided by the project.

Campgrounds and Campsites

Camping is one of the most popular recreational activities at the project reservoirs and recreation sites. Camping occurs at both developed campgrounds and at dispersed campsites, located throughout the project in various locations. There is also some camping that occurs at unimproved, undesignated sites dispersed around several of the reservoirs. Currently some campgrounds and campsites are in need of improvement to address issues associated with old or worn facilities, camping in non-designated sites, and, in some cases, crowding. To address these issues, as part of its proposed Recreation Plan NID proposes modifications, improvements, or upgrades to campgrounds and campsites located at a number of the project recreation sites. NID also proposes new camping facilities at some sites, including the development of a Sawmill Lake family campground and Sawmill Lake group campground (see table 3-226 for specific details). Forest Service condition 41 specifies similar campsite or campground improvements and at several of the sites; however, the Forest Service specifies additional measures, beyond those proposed by NID, at several other sites including: Aspen group campground (reconstruct campground); Findley campground (reconstruct campground, replacing retaining walls); Silvertip group campground (regrade campsite areas, and reconstruct campground); Jackson Meadows group campground (construct a group campground); Jackson Meadows family campground (construct additional family campsites); Bowman Lake campground (expand camping by 20 sites on NFS land, and limit camping to developed campgrounds and designated sites only); Canyon Creek campground (reconstruct campground and convert the west end of the campground into a group site); Canyon Creek dispersed sites (create a campground that incorporates dispersed campsites, and develop additional campsites along Canyon Creek); and Faucherie group campground (rehabilitate group campground facilities) (see table 3-226). In the NID alternative recreation plan, NID proposed similar campground improvements to those outlined in its proposed Recreation Plan. Without exception, California Fish and Wildlife’s recommendations regarding campgrounds and campsites are the same as the Forest Service specifications.

Our Analysis—For many of the project campgrounds, NID and the Forest Service agree on improvement measures to be implemented, particularly where improvements are based on current use and anticipated future demand. At some sites, NID proposes and the Forest Service specifies to modify the existing campgrounds over time to expand facilities, accommodate anticipated increases in campground use, and meet future demand. In other instances, NID is proposing modifications to campgrounds or campsites to improve the current condition of the campground facilities and/or to consolidate dispersed camping into designated areas, with improved facilities. Improvements such as these will benefit recreation users at the project by providing safe and usable camping facilities that are designed to accommodate use by individuals, small groups, and in some cases, larger groups or families. Proposed modifications or expansions to existing campgrounds would also ensure that camping demand at the project is met now and into the future, over the new license term.

At some sites, NID is proposing the consolidation of camping into improved campgrounds and campsites, including designating primitive campsites, and dismantling some dispersed, non-designated campsites. For example, at Bowman Lake, NID proposes to designate improved campsites and dismantling other dispersed, non-designated campsites along the reservoir shoreline. At all such sites,

upgrading primitive campsites and eliminating others would consolidate camping and reduce human effects around the undeveloped portions of the reservoir, thereby helping to preserve the quality of the more remote recreation experience provided at these lakes. Installation of signage would help confine use to designated areas, would reduce the potential for camping in informal, unimproved campsites, and would reduce human use effects on the reservoir shoreline by eliminating or reducing the number of informal campsites.

At Aspen group campground, the only modification proposed by NID is the construction of a pedestrian trail (discussed below). The Forest Service specifies the reconstruction of the campground with improved barriers and expanded parking. No recreational use estimates were provided by NID or the Forest Service for this facility, so it is unclear whether campground reconstruction in 10 years is necessary. However, future recreation monitoring at this site would ensure that information would be available to determine if additional improvements are needed at this site in 10 years.

Use levels at Findley campground are low to moderate with a 2009 average seasonal occupancy of 20 percent and a projected seasonal rate of 31 percent in 2050. NID proposes to replace the existing flush restrooms with vault restrooms, but does not propose to expand the campground or campsites. The Forest Service specifies reconstruction of the campground within 10 years. Given the relative modest use levels at this site, it is not clear that reconstruction of this campground can be justified, at this time. However, NID's proposal to monitor recreation use will ensure that the information will be available to assess whether campground reconstruction would be needed in 10 years.

At Silvertip group campground, the Forest Service specifies a number of improvements not proposed by NID, including regrading campsite areas, and reconstructing the campground in 20 years. Recreational facilities at this site are in fair condition, and use at this campground is moderate, with a seasonal average occupancy of 41 percent in 2009 and a projected seasonal occupancy of 63 percent in 2050. Upgrades to the campsite areas specified by the Forest Service would benefit recreation users by improving existing conditions at this campground, though it is not clear that upgrades of the campsites is needed in the near term. Over the longer term, recreation monitoring proposed by NID will ensure that the information is available to assess the need for reconstructing the campground, as specified by the Forest Service, in 20 years.

At Jackson Meadows reservoir, the Forest Service specifies the construction of a group campground within 4 years and the addition of at least 20 additional family campsites within 8 years. At Jackson Meadows reservoir, use of the existing family campgrounds is moderate, with a seasonal occupancy for the combined family campgrounds of 30 percent in 2009 and a projected combined seasonal occupancy of 46 percent in 2050. East Meadows and Woodcamp campgrounds receive the highest use (seasonal occupancy of 33 percent in 2009 at each campground), which is projected to increase by approximately 50 percent or more at both sites by 2050. Use at Silvertip, the group campground, is moderate with a seasonal occupancy of 41 percent in 2009 and a projected seasonal occupancy of 63 percent in 2050. July had the highest monthly occupancy of all the months, ranging from 38 percent occupancy (Findley campground) to 80 percent occupancy (Silvertip group campground). Recreational use data were only available for the Silvertip group campground. Construction of an additional group campground and additional family campsites would provide recreation users with additional opportunities for camping at Jackson Meadows reservoir to help meet future needs.

Forest Service specifies several measures at Jackson Creek campground, a non-project facility, including the redesign and reconstruction of the campground within 10 years. Use of this campground is low, with less than 1 campsite (0.4 campsite) observed, on average, during the relicensing study and a maximum of 3 campsites observed. Use is highest on holidays (0.7 campsite observed on average/

2 campsites maximum observed) and weekend days (0.6 campsite observed on average /2 campsites maximum observed), as compared to weekdays (0.1 campsite observed on average/1 campsite maximum observed). Since this undeveloped campground is located on NFS land outside the project boundary near Jackson Creek and does not provide direct access to the project lands or waters, upgrades to this campground would not meet recreational needs at the project.

At Bowman Lake, in addition to proposals made by NID for designating primitive campsites, and dismantling all dispersed, non-designated campsites, the Forest Service specifies expanding the campground by 20 sites within 5 years. Although use data were not provided for this site, there is no evidence that expansion of the campground is needed in the near term. Upgrading 10 primitive campsites and eliminating others would consolidate camping use in areas most suited for camping. Installation of signage would help confine use to designated areas and reduce effects on the reservoir shoreline. Consolidation of camping/campsites into designated campground areas would benefit project resources by reducing the shoreline impacts associated with dispersed camping at undesignated and unimproved sites. NID's proposal to monitor recreation use over the term of the license will ensure that there is information available to decide whether there is a need for additional campsites at Bowman Lake.

Currently there are no developed recreational facilities at Sawmill Lake other than an informal day-use area and boat ramp and some dispersed campsites. NID proposes the development of two new campgrounds at Sawmill Lake: the Sawmill Lake family campground and the Sawmill Lake group campground. NID proposes the development of a 10-unit family campground with parking, a restroom, and a hand-carry boat launch. NID also proposes the development of a rustic group campground (25 PAOT) with parking areas and barriers, a restroom, and a hand-carry boat launch. The Forest Service condition for these two areas is similar, but specifies construction of a 15- to 20-unit family campground. All of the upgrades proposed by NID and specified by the Forest Service would provide additional, developed camping in this area of the project that did not exist previously. Because NID proposes to build both a 10-unit family campground and a group campground, the Forest Service's condition to provide a 15- to 20-unit family campground does not appear necessary in the near term. NID also proposes to designate appropriate camping areas and install signage indicating the designated areas and the Forest Service specifies dismantling all dispersed campsites not converted into developed, designated campsites. Dismantling dispersed campsites would have the advantage of further consolidating use in designated areas that would help minimize effects of human activity on project resources.

Currently, there are no dispersed sites along Canyon Creek within the project boundary. There are six to eight existing dispersed campsites to the east of the Canyon Creek campground outside of the FERC boundary. The Forest Service specifies construction within 5 years of a 10- to 15-unit dispersed campground as Development Scale 2²⁴. Although the addition of a 10- to 15-unit dispersed campground

²⁴ The Forest Service Outdoor Recreation Accessibility Guidelines dated May 22, 2006, include the Forest Service Recreation Site Development Scale Definitions. Development Scale 0 means no site modification. Development Scale 1 means there is almost no site modification (i.e., rustic or rudimentary improvements designed for protection of the site rather than comfort of the users). Development Scale 2 means minimal site modification (i.e., rustic improvements designed primarily for protection of the site rather than the comfort of the users). Development Scale 3 means moderate site modification (i.e., facilities about equal for protection of natural site and comfort of users). Development Scale 4 means heavy site modification (i.e., some facilities designed strictly for comfort and convenience of users). Development Scale 5 means extensive site modification (i.e., facilities mostly designed for comfort and convenience of users and usually include flush toilets).

would provide more opportunities for camping at this site, the proposed dispersed campsites would be outside the project boundary and a need has not been demonstrated for camping in this area of the project.

The Faucherie Lake group campground accommodates 50 (PAOT) at 2 group sites. The Forest Service specifies several improvements at this site, including replacement of toilets and picnic tables and expanded parking with accessible spaces. The Forest Service also specifies rehabilitating the remaining campground facilities within 10 years. Use of the Faucherie group campground is high, with a seasonal average occupancy of 66 percent and a weekend rate of 100 percent. Projected future use rates for 2050 are 101 percent seasonally and 154 percent on weekends. The Forest Service specifications for improvements and expansions would help accommodate the heavy use at this site.

The Forest Service also specifies reconstruction of the existing Canyon Creek campground, located a mile downstream of Faucherie Lake on Canyon Creek, as Development Scale 3 with a new group campsite and accessible campsites; replacement of the restrooms; and upgrades to campground roads and spurs. Use levels at the nearby Faucherie group campground are nearing capacity, and the improvements specified by the Forest Service at the Canyon Creek campground would create a new 25 PAOT group campsite in the area that would provide additional opportunities for group camping in the vicinity of Faucherie Lake.

Recreation Site Roads, Parking, and Vehicle Barriers

Roads and parking areas are an important component of many of the project recreation sites. Currently, some of the recreation site circulation roads and parking areas are in need of improvement to address issues associated with location, condition, use, and crowding. To address these issues, as part of its proposed Recreation Plan, NID proposes modifications, improvements, or upgrades to recreation site roads and parking areas at several project recreation sites (see table 3-226 for specific details). Forest Service condition 41 specifies similar road, parking, and vehicle barrier improvements and measures at some of the sites including Pass Creek overflow, Woodcamp boat launch, Woodcamp picnic area, Milton diversion impoundment, Bowman Lake inflow day-use area, Jackson Point boat-in campground, and Sawmill Lake. At many other sites, Forest Service condition 41 specifies additional measures related to recreation site roads, parking, and vehicle barriers including: East Meadow campground (lengthen/widen spurs and reconstruct circulation road); Pass Creek campground (provide additional parking, lengthen/widen spurs); Pass Creek boat launch (provide additional parking spaces, replace vehicle barriers); Aspen group campground (expand parking); Fir Top campground (reconstruct road and lengthen/widen spurs); Findley campground (repair damaged roads, provide additional parking and reconstruct/widen circulation road); Silvertip group campground (reconstruct campground roads and a parking area); Woodcamp complex trail system (improve parking); Jackson Meadows vista (gravel parking area); French Lake (grade and gravel existing informal parking area located outside the locked gate); Canyon Creek campground (provide road surface treatment on all interior campground roads and spurs); Canyon Creek dispersed sites (use existing spurs off main road as campsite spurs and create new spurs for new sites); Faucherie Lake day-use area and boat ramp (designate load/unloading parking spaces); Faucherie Lake dam parking area (rehabilitate parking area and circulation road); and Langa crossing (provide parking area) (see table 3-226 for specific details). In the NID alternative recreation plan, NID proposes similar campground improvements to those outlined in its proposed Recreation Plan. Without exception, California Fish and Wildlife's recommendations regarding campgrounds and campsites are the same as the Forest Service specifications.

Our Analysis—In general, expanding and widening parking areas, spurs, and access roads, such as that proposed by NID at some of the recreation sites, would help improve the utilization of the parking areas and help meet the anticipated increase in demand. Proposed parking expansion in combination with the widening of the access road may result in some change in the character of the recreation site, but such

differences would be small and would not be likely to affect the recreational experience of the user. In addition, repaving parking areas and access roads would help reduce the potential for road-related congestion and would create a safer situation for vehicle traffic. Adding or replacing vehicle barriers and the installation of gates at parking areas and along access roads would keep vehicles out of undesirable locations. Expanding parking areas and turnarounds near boat launches would help reduce or eliminate vehicle congestion at some sites and would meet the anticipated increase in use projected over the term of a new license. Widening of existing roads and spurs and expansion of parking areas would generally improve vehicle access to the project reservoir.

At the East Meadow campground, where NID proposes to expand the existing parking area, the Forest Service additionally specifies road reconstruction, including lengthening and widening of spurs, within 15 years. The expansion of roadways specified by the Forest Service does not appear to be needed at this time based on the low to moderate use levels observed at this site. Moreover, the recreation monitoring and reporting proposed by NID in the Recreation Plan would ensure that information would be available to determine if additional road expansions or improvements are needed at this site in 15 years.

Although NID proposes a number of upgrades to the Pass Creek campground, no specific upgrades to roads, parking, or spurs are proposed. Forest Service condition 41 specifies additional trailer parking and the lengthening and widening of spurs. Pass Creek campground is in good condition and has partially accessible facilities. Use rates are low to moderate, with a 2009 seasonal occupancy of 28 percent and a projected occupancy for 2050 of 43 percent seasonally. Use levels do not appear to necessitate the increased spur length and width, and such expansion would unnecessarily increase road surfaces throughout the campground.

The Forest Service specifies the addition of 21 parking spaces and 6 RV parking spaces at Pass Creek boat launch within 5 years. Use levels at the Pass Creek boat launch are high during both high and low water periods, with weekend occupancy in 2009 of 83 percent (high water) and 67 percent (low water) and projected weekend rates in 2050 of 138 percent (high water) and 111 percent (low water). Based on these use rates, the Forest Service specification to provide additional parking, including both accessible parking and RV parking, is reasonable and would help to meet the anticipated increase in use over the term of the license.

The Forest Service specifies the improvement of vehicle barriers to prevent off-road use, marking of accessible parking, and expansion of parking areas at Aspen group campground within 10 years. Installing vehicle barriers would benefit project resources by preventing OHV use in undesignated areas, which can affect vegetation, habitats, and potentially cultural resources. Providing accessible parking would also improve accessibility at this site. No recreational use estimates were provided by NID or the Forest Service for this facility, so it is unclear whether the Forest Service condition for campground reconstruction in 10 years is necessary. However, future recreation monitoring at this site would ensure that information would be available to determine if additional improvements are needed at this site in 10 years.

At Fir Top campground, the Forest Service specifies rehabilitation/reconstruction of the campground road and widening/lengthening spurs. The existing condition of the Fir Top campground is fair, and use is low to moderate with seasonal use at 29 percent in 2009 and projected to increase to 44 percent by 2050. The Forest Service specification for campground road and spur improvements would benefit recreation users by improving road conditions and providing larger spurs for campground users, but the low to moderate use estimates provided for this facility do not appear to warrant road reconstruction. Routine road maintenance within the project recreation facilities, such as that proposed as part of the NID Recreation Plan would be sufficient to keep the campground in good, usable condition for

in the near term. Future recreation monitoring at this site would ensure that information would be available to determine if additional improvements are needed at this site in 10 years.

The Forest Service specifies repair of damaged roads, including replacement of retaining walls, additional trailer and vehicle parking, and reconstruction of the circulation road at Findley campground. The existing condition of the Findley campground is generally good, although the circulation road and spur surfaces have areas of cracked, sunken, and eroding asphalt. Repairing the circulation road within 3 years, as specified by the Forest Service, would address these existing problems. Use levels at Findley campground are low to moderate. Given these use levels, once repairs are made to the existing road, reconstruction of the circulation road and spurs in 10 years would likely not be necessary. However, future recreation monitoring at this site would ensure that information would be available to determine if additional improvements are needed at this site in 10 years.

At Silvertip group campground, the Forest Service specifies the reconstruction of the interior campground roads and parking area, including the creation of 10 additional parking spaces, at Silvertip group campground within 5 years. The existing condition of the Silvertip group campground is generally fair. Use levels at the Silvertip group campground are moderate but there are only 15 informal parking spaces available. The Forest Service notes in its rationale for its condition that there is often insufficient parking to accommodate the users of this group campground. Reconstructing the interior campground roads and parking area and creating additional parking spaces would address this issue and would have little effect on project resources.

The Forest Service specifies improving the parking area for the Woodcamp Interpretive Trail within 5 years. Although the Woodcamp Interpretive Trail is located outside the project boundary, the trailhead, including a gravel parking area for four vehicles and a kiosk, is located within the existing project boundary. Use levels of the parking area are low. Maintaining the parking area would ensure that the parking area remains in a safe and useful condition for users.

At Jackson Meadows vista, the Forest Service specifies gravelling the parking area at Jackson Meadows vista within 5 years. The parking area provides eight informal parking spaces and the condition is generally good. The Forest Service condition to gravel the parking area within 5 years would ensure that the parking area continues to be maintained and will help improve user access to this unique site.

At French Lake currently, there are no developed recreational facilities. Access to French Lake is by foot only, and primary recreation activities are hiking, backpacking, camping, and fishing. The Forest Service specifies minor improvements to the existing informal parking area located outside the locked gate located about 2 miles from the lake, including the installation of rock barriers to limit OHV access to French Lake. Grading and graveling the existing parking area would benefit recreation users by improving access at this site. Installing barriers would limit OHV access and provide further protection to French Lake resources.

The Forest Service specifies reconstruction of the Canyon Creek campground as Development Scale 3 which would include upgrades to campground roads and spurs. NID's proposed approach to this site is to rehabilitate the existing campground, although it does not specify what improvements would be made to roads and spurs. As noted previously, however, use levels at the nearby Faucherie group campground are nearing capacity, and because of that, use is expected to increase at Canyon Creek campground. Improvements to the campground roads and spurs would improve existing facilities at Canyon Creek campground and accommodate higher recreation use.

At the Faucherie Lake day-use and boat ramp, the parking area consists of an undeveloped, informal gravel parking area for about 25 vehicles and a boat launch. NID's proposal to improve parking and barriers at the boat launch site would help limit the facility to car-top, carry-in boat launching, which

would minimize shoreline disturbance and help maintain the natural character of the lake. NID's proposal to install a gate at the dam access road would prevent vehicles from accessing the dam and associated structures, and would also prevent OHVs from crossing the dam, making their way across Canyon Creek below the spillway, and traveling into NFS land designated as non-motorized. The Forest Service also specifies the rehabilitation of the associated parking area and circulation road within 10 years. As no recreational use estimates were provided by NID or the Forest Service for this site, it is unclear whether the Forest Service specification for rehabilitation of the road and parking area in 10 years is necessary. However, future recreation monitoring at this site would ensure that information would be available to determine if additional improvements are needed at this site in 10 years.

Host Sites

Forest Service condition 41 and BLM condition 31 specify the upgrade of host sites with a minimum of septic and water to improve public service and to attract high quality hosts. At Jackson Meadows family campgrounds, the Forest Service specifies a host site at each new family campground. At East Meadow campground, Pass Creek campground, and Woodcamp campground, the Forest Service specifies upgrades to host campsites to include septic or holding tank (or leach system) and a hydrant for water hook-up at the site. At Bowman reservoir area, the Forest Service specifies at least one host site within the basin with potable water, septic system or holding tank, and power (preferably solar panels or quiet generator). The Forest Service also specifies a host campsite within the Bowman Recreation Corridor that includes water, septic system or holding tank, and preferably power (e.g., solar panels or quiet generator) at the campground where the potable water is provided.

Our Analysis—Campground hosts serve a role in helping to manage and patrol the campgrounds. Updating and providing host sites at campgrounds would improve public safety and campground management. However, the Commission cannot ensure that a host is present at every campground, or that public safety would be improved. The responsibility for recreation facility monitoring is that of the licensee. Designating and upgrading one campsite at a campground with special amenities may be useful for attracting hosts, but the Commission has no way of ensuring that the presence of a host would accomplish a project purpose or improve a project effect.

Trails and Access Measures

There are numerous trails located within the project area. Some of these trails lie fully within the project boundary and connect two project-related facilities. Other trails may lie outside or partially outside the project boundary and connect a project facility to a non-project facility or connect two or more non-project facilities. In addition, there are several trailheads located within the project boundary. Often these trailheads are associated with project recreation facilities such as parking areas, campgrounds, or day-use areas. In some cases, these trailheads are for trails that quickly leave the project and connect to other non-project trails or facilities. As shown in table 3-227, NID proposes to develop or make improvements to several trails. Forest Service condition 41 contains provisions for several trails or trail-related measures, which are also noted in the table, some of which are similar to those proposed by NID. California Fish and Wildlife has also made 10(j) recommendations for trails, but in all instances the California Fish and Wildlife's 10(j) recommendations for trails are identical to the Forest Service condition. Additional trail recommendations specified by the Forest Service in condition 41 and recommended by California Fish and Wildlife in measure 16 include: constructing/maintaining pedestrian, native surface trails within Fir Top campground, including the interpretive nature trail through the adjacent Woodcamp campground and the Fir Top campground loop; and widening the existing trail that connects the parking area to Silvertip group campground.

Table 3-227. Trails proposed in the NID Recreation Plan or the NID Alternative Recreation Plan or included in Forest Service condition 41, California Fish and Wildlife measure 16, or BLM condition 1. (Source: staff)^a

Trail/Trailhead Location	NID Recreation Plan Proposal	Forest Service Condition 41, California Fish and Wildlife Measure 16 or BLM Condition 1 Trail Provisions	Trail Description	Inside the Project Boundary
East Meadow campground	Construct/maintain a pedestrian trail.	Same provision	Non-motorized trail (~0.1 mile) from the East Meadow campground to the river	Fully within the project boundary
Pass Creek boat launch	Construct/maintain an accessible trail.	Same provision	Provides accessible access from the parking area to the boat launch	Fully within the project boundary
Aspen picnic area	Construct a non-motorized trail (Alternative Recreation Plan).	Construct a non-motorized trail.	Connects the group campground to the parking area at Aspen picnic area	Fully within the project boundary
Fir Top campground	No trail proposal	Construct/maintain pedestrian native surface trails within 10 years.	Includes a half-mile interpretive nature trail through the adjacent Woodcamp campground and the Fir Top campground loop.	Fully within the project boundary
Silvertip group campground	No trail proposal	Widen existing campground trail.	Connects the parking area to the Silvertip group campground	Fully within the project boundary

Table 3-227. Trails proposed in the NID Recreation Plan or the NID Alternative Recreation Plan or included in Forest Service condition 41, California Fish and Wildlife measure 16, or BLM condition 1. (Source: staff)^a

Trail/Trailhead Location	NID Recreation Plan Proposal	Forest Service Condition 41, California Fish and Wildlife Measure 16 or BLM Condition 1 Trail Provisions	Trail Description	Inside the Project Boundary
Woodcamp Complex Trail System	Construct pedestrian trails; install trailhead and trailhead signage.	Same provision	Trail one connects the project recreation facilities within the Woodcamp Complex (Fir Top, Findley, Woodcamp, and Silvertip group campgrounds; and Woodcamp picnic area)	Fully within the project boundary
			Trail two would be a pedestrian connector trail within the existing project boundary from the aforementioned Woodcamp Complex Trail System to the trailhead of the non-project Woodcamp Interpretive Trail.	Fully outside the project boundary
Jackson Meadows Area – Additional Trail Construction	No trail proposal	Install and maintain trailhead and directional signage on all trails in the Jackson Meadows area within 5 years.	Trail one connects Vista Point and Aspen group campground to a lake overlook.	Location of trail could not be determined ^a

Table 3-227. Trails proposed in the NID Recreation Plan or the NID Alternative Recreation Plan or included in Forest Service condition 41, California Fish and Wildlife measure 16, or BLM condition 1. (Source: staff)^a

Trail/Trailhead Location	NID Recreation Plan Proposal	Forest Service Condition 41, California Fish and Wildlife Measure 16 or BLM Condition 1 Trail Provisions	Trail Description	Inside the Project Boundary
		Construct and maintain a non-motorized trail from Vista Point and Aspen group campground to a lake overlook within 5 years.	Trail two connects the Woodcamp Complex to English dam.	Partially within the project boundary
		Construct and maintain a new, non-motorized trail from the Woodcamp Complex to English dam. If not feasible to connect with the Woodcamp Interpretive Trail, provide trailhead facilities within 15 years.		
Bowman Recreation Corridor Trail Development	No trail proposal	Within 2 years construct/maintain a pedestrian bridge over Canyon Creek at/near Sawmill Lake,.		Location of trail could not be determined ^b
		Within 2 years construct/maintain a walkway across Sawmill spillway.		Fully within the project boundary
		Within 2 years construct/maintain a trail from the family and group campgrounds to the Grouse Ridge Trail.		Location of trail could not be determined

Table 3-227. Trails proposed in the NID Recreation Plan or the NID Alternative Recreation Plan or included in Forest Service condition 41, California Fish and Wildlife measure 16, or BLM condition 1. (Source: staff)^a

Trail/Trailhead Location	NID Recreation Plan Proposal	Forest Service Condition 41, California Fish and Wildlife Measure 16 or BLM Condition 1 Trail Provisions	Trail Description	Inside the Project Boundary
		Within 2 years construct/maintain a primitive trail from Faucherie Lake to Sawmill Lake.		Partially within the project boundary
Bear River Trail	None	Cooperate with trail planners for trail along Bear River; provide perpetual public access of trail and roads across NID lands; support trailhead development, sanitation and signage.	Trail would be a non-project facility along the Bear River partially outside the project boundary.	Partially within the project boundary

^a Staff made effort to determine if the trail is located within or outside the project boundary based on NID's Recreation Plan, Forest Service 4(e) and 10(a) conditions (Condition 44 Recreation Plan), and California Fish and Wildlife Response to Notice of Ready for Environmental Analysis, Federal Power Act Section 10(j) and 10(a) Recommendations, Yuba-Bear Hydroelectric Project.

^b The location is either partially or fully within project boundary but could not be determined

Forest Service condition 41, California Fish and Wildlife measure 16, and BLM recommendation 16 also recommend that NID assist with the development of a trail along Bear River (Bear River Trail). The Bear River Trail is a 33-mile riverine recreation trail proposed along the Bear River in Placer and Nevada Counties starting at the headwaters of the Bear River in Bear Valley and ending at NID's Combie reservoir. According to BLM, about 15.5 miles of the trail would be on PG&E property, 6 miles on NID property, 4.9 miles on NFS lands, 4.4 miles on BLM lands, 2.7 miles on Placer County lands (Bear River campground), and 3 miles on private lands.

Our Analysis—The Commission considers trails that connect one or more project facilities to be necessary for project purposes. Some existing project trails connect project facilities to other non-project trails or non-project recreation facilities. To the extent that such trails or trailheads already exist within the project boundary, they are considered a project facility. However, new trails or trail facilities that do not connect two project facilities are not considered necessary for project purposes. NID's trail proposals generally seem consistent with trails that the Commission would consider necessary for project purposes. However, at some sites, it is not clear whether a proposed trail or trailhead facility is either wholly within the project boundary or is intended to connect two project facilities.

NID's proposals to develop or improve trails or trailheads would benefit recreation users. New trails that are intended to connect two or more project facilities would enhance recreational use at the project by connecting two or more project facilities and consolidating foot traffic to a designated trail. In addition, repair/replacement of portions of existing project trails would help to ensure that the trail or trail facility remains safe and usable for the term of the new license. Additional trails proposed would also help to meet increased recreational demand at the project over the new license term.

The additional trail recommendations specified by the Forest Service, including constructing/maintaining pedestrian, native surface trails within Fir Top campground, the interpretive nature trail through the adjacent Woodcamp campground and the Fir Top campground loop, and widening the existing trail that connects the parking area to Silvertip group campground, are all improvements that serve a project purpose and would benefit recreation users and project resources by consolidating foot traffic to the improved, designated trail.

The Forest Service also specifies a number of trail developments within the Jackson Meadows recreation area and within the Bowman Recreation Corridor. One trail would connect the Vista Point and group campground to a lake overlook. Another trail would connect the Woodcamp complex to English dam. There are numerous trails throughout both these areas, some of which lead to or connect project facilities. However, many of the trails in these areas lie outside the project boundary and do not directly connect two or more project facilities. To the extent that these existing trail systems provide direct access to project facilities, it is appropriate for NID to maintain the portion of the trail that leads directly to the project facilities, and to provide appropriate signage within the project boundary. However, any new trails or trail modifications specified by the Forest Service or recommended by California Fish and Wildlife that do not directly connect two project facilities would be considered unnecessary for project purposes.

The Bear River Trail is a riverine recreation trail proposed along the Bear River in Placer and Nevada Counties starting at the headwaters of the Bear River in Bear Valley and ending at NID's Combie reservoir. According to information provided by BLM, a portion of the trail would be on NID property; however, the exact location of the proposed trail was not provided by BLM, nor did the information provided about the proposed trail make it possible to determine what portion of the trail, if any, would lie within the project boundary. Although development of such a trail would provide benefit to recreation users within the region, based on the information provided, there does not appear to be a clear nexus between this trail and the project. Therefore, it would not be appropriate to require NID to construct this trail or to carry out measures related to this trail.

Boat Launches and Boat Ramps

Boating is a popular recreational activity at the project reservoirs. NID provides boat launching facilities on several of the reservoirs, including boat ramps for vehicle launching at Pass Creek boat launch (Jackson Meadows reservoir), Woodcamp boat launch (Jackson Meadows reservoir), Orchard Springs recreation complex (Rollins reservoir), Bowman Lake campground, Faucherie day-use and boat launch, Greenhorn recreation complex (Rollins reservoir), Peninsula recreation complex (Rollins reservoir), and Long Ravine recreation complex (Rollins reservoir). In addition to the boat launches provided at the project, hand launching of non-motorized boats (canoes and kayaks) may also occur elsewhere at the project reservoirs. Currently, some boat launch facilities are in need of improvement to address issues associated with worn or deteriorating facilities, vehicle launching at sites intended for hand launching, as well as use-levels and crowding. Extensions to boat ramps to make the ramps usable under a greater range of reservoir water levels is also an issue that we discuss in the next section.

To address these issues, as part of its proposed Recreation Plan, NID proposes certain modifications, improvements, or upgrades to existing boat launch and boat ramp facilities at Woodcamp

boat launch, Milton diversion impoundment, Bowman Lake, and Faucherie Lake (see table 3-226 for details). Forest Service condition 41 specifies similar boat launch improvements at the Milton diversion impoundment, Bowman Lake, and Faucherie Lake (see table 3-226 for details). Forest Service condition 41 specifies additional measures related to boat launch and boat ramp improvements at other sites, including Pass Creek boat launch (provide asphalt treatment on high water launch within 1 year, provide low-water boat launching access (discussed below under boat ramp extensions) and reconstruct boat ramp within 15 years), and Woodcamp boat launch (upgrade to a 2-lane ramp with accessible courtesy dock and sidewalk within 5 years). In the NID Alternative Recreation Plan, NID proposes similar boat launch improvements to those outlined in its proposed Recreation Plan. Without exception, California Fish and Wildlife's recommendations regarding boat launches and boat ramps are the same as the Forest Service specifications.

Our Analysis—At the Pass Creek boat launch, NID proposes the construction of an accessible trail along the shoreline, but no specific measures related to the boat launch. Forest Service condition 41 specifies several measures related to the boat launch including improvements to the boat launch, provision of low-water boat launching (discussed below under boat ramp extensions) and reconstruction of the boat ramp within 15 years. Use levels at the Pass Creek boat launch are high during both high and low water periods, with weekend occupancy in 2009 of 83 percent (high water) and 67 percent (low water) and projected weekend rates in 2050 of 138 percent (high water) and 111 percent (low water). Based on these use rates, the Forest Service specification to provide additional parking, including both accessible parking and RV parking, is needed and would help to meet the anticipated increase in use over the term of the license. As noted previously, parking expansion would result in additional clearing of vegetation, but with sound construction and sediment and erosion control practices, construction effects on project resources would be minimal. The existing two-lane, concrete ramp itself is in good condition, and future monitoring of use and condition, as proposed in NID's Recreation Plan, would determine the potential need for reconstruction in 15 years. We discuss recommended provisions for low-water boat launching later in this section.

NID proposes several upgrades to the Woodcamp boat launch, including replacing the existing launch ramp. The Forest Service specifies replacement of the existing boat ramp with a two-lane ramp and adding an accessible courtesy dock and sidewalk. The existing condition of the Woodcamp boat ramp is fair. The concrete boat ramp is eroding at the edges and is very narrow. NID's proposal to reconstruct the ramp and restroom would address these issues. Use at the Woodcamp boat launch is low, with a seasonal average occupancy of 10 percent and a weekend rate of 8 percent. Projected future use rates for 2050 are 16 percent seasonally and 13 percent on weekends. However, use rates at the Pass Creek boat launch are very high, and improvements to the Woodcamp boat launch, as specified by the Forest Service would help to meet anticipated increased demand for boat launch facilities at Jackson Meadows reservoir overall.

Boat Ramp Extensions

NID's proposed Recreation Plan includes a provision for replacing the concrete ramp at the Woodcamp boat launch to California Department of Boating and Waterways standards and to maintain all boat ramp surfaces in good condition.

Forest Service condition 41 specifies and California Fish and Wildlife 10(j) recommendation 16 recommends NID provide additional boating access to Jackson Meadows reservoir. Specifically, the Forest Service specifies and California Fish and Wildlife recommends that NID provide low-water boat launching access at the Pass Creek boat ramp by grading and installing gravel below the existing constructed ramp to allow for launching until September 30 in critically dry water years. Additionally, the Forest Service specifies and California Fish and Wildlife recommends that NID provide for launching

at the Woodcamp boat ramp, to the degree topographically feasible, until September 30 in dry water years.

NID's Alternative Recreation Plan includes a provision to provide low-water boat launching access below the constructed Pass Creek ramp until September 30 in critically dry water year types through basic improvements such as clearing, grading, and installing gravel. Prior to implementing any of these basic improvements, the Forest Service and NID would mutually evaluate the condition below the constructed end of the boat ramp and determine if providing access is safe and reasonable.

Our Analysis—NID reports that the Pass Creek boat ramp at Jackson Meadows reservoir is currently functional when the reservoir is at or above elevation 5,996.5 feet msl. Table 3-228 provides the median water surface elevations for the project reservoirs with concrete boat ramps for different water year types based on tables provided by NID in its August 2012 supplemental filing to the amended license application. Under NID's proposed streamflows, the Pass Creek boat ramp would, on average, be unusable for the majority of the recreation season (July 1 through September 30) in critically dry and extreme critically dry water year types, consistent with the no-action alternative. However, in dry water year types, the boat ramp would, on average, be functional for about 15 days less than it currently is in September. NID and PG&E report that critically dry/extreme critically dry water year types only occurred in 4 years (12 percent) out of the 33-year period of record (1976-2008) and dry water year types occurred in 8 years (24 percent) out of the 33-year period of record. Improvements to make the boat ramp functional until September 30 in critically dry years would greatly enhance boating opportunities on Jackson Meadows reservoir. NID's proposed alternative to evaluate the condition below the constructed end of the boat ramp to determine the safety of providing low-water access prior to implementing the improvements specified by the Forest Service and recommended by California Fish and Wildlife is reasonable. If the Forest Service and NID determine that implementing the improvements specified by the Forest Service creates a safety issue for low-water boat launching, extending the boat ramp by approximately 5 vertical feet would help maintain the current number of days the boat ramp is functional and would make the ramp functional in dry water years through September 15. Jackson Meadows reservoir receives high recreational use and ensuring that at least one boat ramp at the reservoir is usable for the entire recreation season would allow users to boat on the reservoir for an extended period of time. Although the majority of Jackson Meadows visitors responding to a survey conducted during the relicensing study indicated that they had no opinion or that water surface elevation was not an issue for launching boats, about 7 percent of the respondents indicated it was a small issue.

NID reports that Woodcamp boat ramp at Jackson Meadows reservoir is currently functional when the reservoir is at or above elevation 6,016 feet msl. Under NID's proposed streamflows, Woodcamp boat ramp would, on average, be unusable from July 1 through September 30 in critically dry and extreme critically dry water year types, which is consistent with the no-action alternative. NID's proposed streamflows would, on average, reduce the number of days in dry water year types that the Woodcamp boat ramp is functional by about 15 days (the ramp would be unusable for the period July 15 through September 30). In all other water year types, the Woodcamp boat ramp would be functional until September 15 and, in wet water year types, until September 30. Critically dry and extreme critically dry water year types occurred infrequently during the period of record; however, dry water year types occurred in almost one-quarter of the years during the period of record ramp. Reducing the number of days the boat ramp is functional during the peak recreation season would negatively affect recreational boating opportunities.

Table 3-228. Median water surface elevations for Jackson Meadows and Rollins reservoirs. (Source: NID, 2011a, as modified by staff)

Water Year Types	No-Action Alternative (Elevation in feet msl)							NID's Amended Minimum Flow Releases (Elevation in feet msl)						
	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30
Jackson Meadows Reservoir														
Wet	6,035.1	6,034.9	6,031.6	6,027.3	6,021.8	6,017.2	6,012.1	6,034.1	6,033.9	6,030.8	6,026.5	6,021.0	6,016.4	6,011.7
Above Normal	6,033.0	6,032.9	6,029.1	6,024.6	6,019.1	6,014.4	6,009.2	6,034.4	6,032.7	6,029.1	6,024.8	6,019.2	6,014.5	6,009.3
Below Normal	6,033.3	6,030.8	6,027.0	6,022.4	6,016.7	6,011.8	6,006.4	6,033.2	6,030.8	6,027.0	6,022.4	6,016.7	6,011.8	6,006.4
Dry	6,020.1	6,017.7	6,013.5	6,008.6	6,002.4	5,997.1	5,992.3	6,016.0	6,012.9	6,008.7	6,003.6	5,997.2	5,991.5	5,986.5
Extreme Critically Dry & Critically Dry	5,992.7	5,988.6	5,982.7	5,975.1	5,965.6	5,961.4	5,956.6	5,984.2	5,979.7	5,973.1	5,965.6	5,960.2	5,955.0	5,948.6
Rollins Reservoir														
Wet	2,171.2	2,170.1	2,170.6	2,166.9	2,164.7	2,160.4	2,141.3	2,171.1	2,171.1	2,168.7	2,166.9	2,164.7	2,160.4	2,141.2
Above Normal	2,170.9	2,170.0	2,171.0	2,166.9	2,164.7	2,160.4	2,141.1	2,170.9	2,170.1	2,170.6	2,166.9	2,164.7	2,160.4	2,141.1
Below Normal	2,170.9	2,170.0	2,168.7	2,166.9	2,164.7	2,160.4	2,141.1	2,170.9	2,170.0	2,168.7	2,166.9	2,164.7	2,160.4	2,141.1
Dry	2,170.9	2,170.0	2,168.7	2,166.9	2,164.7	2,160.4	2,141.0	2,170.8	2,169.3	2,167.1	2,166.2	2,164.7	2,160.4	2,141.1
Extreme Critically Dry & Critically Dry	2,158.9	2,150.6	2,142.5	2,137.1	2,131.3	2,123.7	2,091.9	2,160.7	2,153.2	2,141.9	2,132.9	2,116.6	2,097.0	2,054.4

Notes: Shaded cells indicate periods when the reservoir elevation would be below the bottom usable portion (3 vertical feet above the end of the paved ramp) of one of the existing ramps.

Shaded cells with italicized font indicate periods when the reservoir elevation would be below the bottom usable portion (3 vertical feet above the end of the paved ramp) of all the existing ramps at the reservoir.

Although NID does not propose any provisions to extend any of the four boat ramps at Rollins reservoir, NID reports that the Orchard Springs, Greenhorn, Peninsula, and Long Ravine boat ramps at Rollins reservoir are currently functional when the reservoir is at or above elevation 2,133, 2,133, 2,146, and 2,137 feet msl, respectively. Under NID's proposed streamflows, none of the four boat ramps at Rollins reservoir would, on average, be functional from August 15 through September 30 in critically dry and extreme critically dry water year types. NID's proposed streamflows would reduce the number of days that all four boat ramps are functional by about 15 days in critically dry and extreme critically dry water year types (the ramps would all be unusable from August 15 through September 30). In all other water year types, all four boat ramps would, on average, be functional for the entire peak recreation season (until September 30). Although critically dry and extreme critically dry water year types occurred infrequently during the period of record, reducing the number of functional days for all the boat ramps during the peak recreation season would negatively affect recreational boating opportunities. This project reservoir receives the highest total recreational use. The majority of Rollins visitors responding to a survey conducted during the relicensing study indicated that they had no opinion or that water surface elevation was not an issue for launching a boat; however, some respondents indicated that it was a small problem at Orchard Springs (7.4 percent), Greenhorn (6.5 percent), Long Ravine (5.9 percent), and Peninsula (2.6 percent).

Langs Crossing

The Forest Service specifies that NID work cooperatively with the Forest Service and the licensee for Yuba-Bear Hydroelectric Project²⁵ to equitably share responsibility amongst the three entities for providing facilities, including a vault toilet, parking area, picnic site, and trash containers, on NFS lands adjacent to Bowman Road to Langs Crossing within 5 years. The Forest Service states in its rationale provided with condition 41 that Langs Crossing is a heavily used dispersed recreation area with no sanitation or other facilities, located on the South Fork of the Yuba River 1 mile below Spaulding dam near the Bowman Road (Forest Service Road 18) crossing of the South Yuba River. There are popular swimming areas both upstream and downstream of the bridge. According to the Forest Service, there are four land ownerships involved in the recreation use at Langs Crossing: Tahoe National Forest, NID, PG&E, and a private parcel. Camping has been prohibited in this area, but according to the Forest Service, day use of the area and lack of sanitation facilities has created a human waste issue.

Our Analysis—The Langs Crossing area is located outside the project boundary approximately 1 mile below Spaulding dam near the Bowman Road (Forest Service Road 18) crossing of the South Yuba River. Popular swimming areas are located both upstream and downstream of the bridge that attract visitors. This area does not provide access to project facilities and, therefore, is not necessary for project purposes. Providing facilities at Langs Crossing would provide benefit to recreation users; however, there does not appear to be a nexus between this area and the project. Therefore, it would not be appropriate to require NID to share responsibility for providing facilities related to this area. The Forest Service specification is unclear as to how this shared responsibility for improvements at Langs Crossing would be accomplished.

Jackson Sanitary Dump Station

The NID Recreation Plan proposes to implement measures to improve the efficiency of the existing dump facility, located at Jackson Meadows reservoir across from the Pass Creek campground and boat launch. The Forest Service specifies major improvements to be made at this site, including

²⁵ It is assumed that the Forest Service intended to specify that NID would work cooperatively with the Forest Service and the licensee for the Drum-Spaulding Project.

construction of a dump station with leach field, provision of potable water, and provision of an RV filling station. According to information provided by NID, the Jackson sanitary dump is lightly used, and NID has indicated its desire to avoid making costly investments in major modifications at this facility, and reserves the right to decommission the facility if the facility continues to, after efforts to improve facility usage and efficiency, receive inadequate/low levels of use to justify the expense of providing the facility. The Forest Service specifies that NID consider alternative uses for the sanitary dump site in the event it is decommissioned.

Our Analysis—According to information provided by NID, the Jackson sanitary dump station receives very light use. Although the existing dump station does not feature the most up-to-date facilities, NID’s proposals to implement measures to improve the efficiency of the dump site appear reasonable and would meet the existing use, given the facilities’ light use. Future use monitoring at this site would ensure that information would be available to evaluate the continued need for this site during the term of the new license.

Jackson Meadows Reservoir Administrative Center

The Jackson Meadows administrative center is a NID-constructed facility located on Forest Service lands. The center, which includes four buildings, is currently maintained by the Forest Service concessionaire and used primarily by Forest Service personnel only. The Forest Service uses the administrative center as an administration and management center for Forest Service facilities located throughout the region, not just project facilities. The center is not a public use site except for a small general store. NID proposes to remove the center from the project boundary as it is no longer needed or used for project purposes. The Forest Service condition specifies that NID maintain the existing buildings, demolish the barracks building, and revegetate the site. The NID alternative plan is similar to the Forest Service condition, but does not include maintenance of the facility.

Our Analysis—The center is currently maintained by the Forest Service concessionaire and the facility is used primarily by Forest Service personnel only. The center is not a public recreation site and is not available for public use, except for a small general store run by the Forest Service concessionaire. Given its current use by the Forest Service, the center no longer serves as a project facility and does not appear to be necessary for project purposes. We discuss NID’s proposal for removing this area from the project boundary in more detail in section 3.3.7, *Land Use And Aesthetic Resources*.

Chicago Park Forebay

The Chicago Park forebay is a small reservoir with no developed recreation facilities, a powerhouse, and two access roads with locked gates. BLM condition 34 specifies that NID sign an assistance agreement with BLM within 1 year and develop a rehabilitation plan to block, gate, and rehabilitate roads and trails at this site.

Our Analysis—A rehabilitation plan for the Chicago Park powerhouse would effectively close the area around the Chicago Park powerhouse to recreation. Significant resource damage is occurring from off-road trails and roads, and the recreation use study during relicensing identified public safety concerns due to firearm discharges in this area. The purpose of the proposed closure at the Chicago Park powerhouse is to stop resource damage, occupancy trespass, erosion, and loss of plant and wildlife habitat. This closure would be implemented by BLM working with NID on the blocking, gating, barricading, and rehabilitating unauthorized trail and road access in the area. To stop resource damage, BLM and NID propose to meet annually to discuss an action plan for the upcoming year that includes rehabilitating, patrolling, and maintaining the area. Although closing the Chicago Park powerhouse area to the public would reduce the undeveloped recreational opportunities at this area, recreational use in this

area is creating public safety concerns and resource damage. Similar opportunities for undeveloped recreational use are provided nearby at Dutch Flat afterbay and Dutch Flat no. 2 forebay.

Recreation Facility Operation and Maintenance

NID's proposed Recreation Plan outlines provisions for O&M of project recreation facilities. NID would be responsible for the annual maintenance of all the project recreational facilities at Jackson Meadows reservoir, Milton diversion impoundment, Bowman Lake, Faucherie Lake, Sawmill Lake, Canyon Creek campground, and Rollins reservoir. NID would solely operate and maintain all the project recreation facilities, but could contract with concessionaires for the administration and O&M of the project's recreation facilities. NID proposes that the maintenance standards at project recreation facilities at Jackson Meadows reservoir, Milton diversion impoundment, Bowman Lake, Faucherie Lake, Sawmill Lake, and Canyon Creek campground would be consistent with the Forest Service cleaning and policing requirements.²⁶ The proposed Recreation Plan details the required O&M activities at developed recreation facilities and a schedule for annual maintenance activities.

The Forest Service specifies in condition 41 measures to address O&M of project recreation facilities on NFS lands that are generally consistent with those proposed in NID's Recreation Plan. The Forest Service also specifies that NID coordinate with the Forest Service and BLM to develop a plan to address the costs of managing project-related recreation on NFS and BLM lands.

NID's alternative to Forest Service condition 41 states that NID would, within 1 year of license issuance, implement the Recreation Facilities Plan filed with FERC on August 29, 2012 (Alternative Recreation Plan). The Alternative Recreation Plan provision to address O&M is identical to that in the proposed Recreation Plan, except NID clarifies that the maintenance standards at project recreation facilities on NFS lands would be consistent with the Forest Service's cleaning and policing requirements.

BLM condition 31 specifies routine maintenance tasks for NID at project recreation facilities on BLM lands that are generally consistent with those proposed in NID's Recreation Plan and specified by the Forest Service. In addition to those measures, BLM includes several routine maintenance tasks:

- Annually maintain fire ring clearances at designated dispersed sites (10-foot diameter to bare mineral soil and 10-foot clearance above fire ring).
- Within and adjacent to all developed project recreation sites, provide for periodic silvicultural evaluation, stand improvement, view enhancement, and vegetative planting work to identify unseen hazard trees, ensure stand health, provide for screening within and between sites, and enhance views of project lakes and other scenic features.
- Every 2 years, inspect all fire rings and maintain them in good condition or replace. Good condition includes a level grill with a usable grate.

BLM condition 35 specifies that, beginning 90 days after license issuance, NID would enter into a recreation O&M agreement to provide \$30,000 annually to BLM for operation, maintenance, law enforcement patrolling, and administration in accordance with the Recreation Plan. BLM further specifies that it is working with NID to develop a separate agreement that addresses this condition and this condition would be removed once the agreement is finalized.

²⁶ "Cleaning Recreation Sites," U.S. Department of Agriculture, Forest Service, San Dimas Technology Development Center, August 1995 (SDTC 9523-1206) and the Recreation Sites National Quality Standards, February 5, 2002.

BLM condition 37 specifies that NID would coordinate within 1 year of license issuance with BLM to develop a plan to address the costs of managing project-related recreation on BLM lands.

California Fish and Wildlife includes provisions in its 10(j) recommendation 16 to address O&M and the costs of managing project-related recreation on NFS and BLM lands that are the same as those included in Forest Service condition 41 and BLM condition 37.

Our Analysis—Proper O&M of project recreation facilities helps to ensure that proper upkeep of these facilities and associated public recreational access are provided over the term of the license. NID would be responsible for managing, operating, and maintaining all recreation facilities within the project boundary to provide safe and adequate public access to the project. NID would be responsible for existing recreation facilities upon license issuance and new recreation facilities upon construction. Although Forest Service condition 41 and California Fish and Wildlife 10(j) recommendation 16 indicate that NID would develop a plan to address the costs of managing project-related recreation on NFS and BLM lands, this mechanism would not relieve NID of its responsibility and, therefore, would not be a necessary measure to include in the Recreation Plan. Although addressing the costs of managing project-related recreation would be beneficial to the Forest Service and BLM, NID is ultimately responsible for those facilities within the FERC boundary. Further, the Commission would have no way of determining how the annual payment would specifically be used to operate and maintain recreation facilities at the project.

Water System Developments

NID's proposed Recreation Plan includes a provision for NID to upgrade the existing water systems at each facility unless NID and the Forest Service (for facilities on NFS land) agree that the upgrade is not necessary. The upgrade at each facility would include replacement of existing distribution piping, system connections, and water hydrants, and would maintain the same system design and footprint, as warranted. NID proposes, during the planning for water distribution system, to evaluate if the footprint should be reviewed to determine if there is a design that would better serve recreationists and/or different source designs that would take advantage of new technology. However, from the information provided, it is unclear as to exactly what this proposal entails. The NID Recreation Plan indicates that, as a general rule, all water systems would be upgraded at least once during a new license term. NID also proposes to replace the existing water storage tanks at Jackson Meadows reservoir at the end of their useful lives and to evaluate expanding the capacity of the storage tanks.

Under condition 41, the Forest Service specifies that NID ensure recreation facilities that provide drinking water, as well as future drinking water systems, be managed as public drinking water systems (i.e., serve at least 15 service connections or 25 persons) under the Safe Drinking Water Act. The Forest Service specifies that NID construct group campground facilities and additional family campsites with potable water at Jackson Meadows reservoir area, provide potable water at the Jackson sanitary dump station, and provide a minimum of a potable water system at one of the campgrounds in the Bowman Recreation Corridor.

California Fish and Wildlife includes provisions in its 10(j) recommendation 16 to address water systems that are identical to those included in Forest Service condition 41.

Our Analysis—Relicensing studies indicate the need for additional potable water at the project recreation facilities. Water systems are integral to the recreation sites they serve. Visitors to recreation facilities that are developed in areas with rural and roaded natural Forest Service ROS designations expect the availability of potable water. Providing potable water would help address the needs at project sites by providing more sources of drinking water for visitors at the project. The addition of potable water would also enhance the recreational experience at these sites, and is consistent with facilities and services that

recreation users would expect at similar regional recreation sites designated under the Forest Service Recreation Opportunity Spectrum (ROS) as “rural and roaded natural.”

NID’s proposal to, during the planning for replacement of water distribution systems, evaluate if the footprint should be reviewed to determine if there is a design that would better serve recreationists by helping to address the need for additional potable water at the project. However, from the information provided, it is unclear as to exactly what this proposal entails. NID’s proposal to replace the existing water storage tanks at Jackson Meadows reservoir at the end of their useful lives and to evaluate expanding the capacity of the tanks would help address the unreliable water sources in the Jackson Meadows reservoir area.

Although Forest Service policy states that all water systems be managed as public drinking water systems (i.e., serve at least 15 service connections or 25 persons) under the Safe Drinking Water Act, there is no guarantee that NID would be able to manage the public water systems to serve 15 service connections or 25 persons at the project. Furthermore, regulating and enforcing drinking water laws are outside the Commission’s authority. In Sierra County, the California Department of Public Health regulates and enforces the drinking water quality laws and regulations. Nevada and Placer Counties regulate and enforce the drinking water laws and regulations through their own health departments.

Recreation Monitoring

NID’s proposed Recreation Plan outlines detailed components of its proposed recreation monitoring program for the term of a new license at the project. NID proposes a facility and monitoring approach that uses monitoring indicators and standards, such as occupancy rate and user preferences. The proposed Recreation Plan proposes standards that when exceeded, trigger a review of potential management actions, but do not mandate a particular action. NID also proposes a recreation questionnaire survey every 12 years in Form 80 monitoring years.

NID’s proposed Recreation Plan outlines several methods to collect information on recreation monitoring indicators and standards, including compiling existing available daily and annual occupancy information; a recreation observation survey that would include surveying during non-holiday periods from Memorial Day through Labor Day; and a recreation questionnaire survey during recreation seasons. NID’s proposed Recreation Plan outlines future development triggers.

NID proposes to prepare a Form 80 every 6 years and to also prepare a comprehensive project recreational use report that would summarize the previous 6 years of project recreation fee/occupancy indicator information; summarize recreation observation survey indicator and other data collected during the 6-year period; and proposed changes in project facilities and/or project management. Every 12 years, NID proposes to prepare a recreation questionnaire survey report. NID proposes to provide a draft of the final recreation questionnaire survey report to the Forest Service and other applicable agencies, as appropriate for a 60-day review. NID proposes to file the final recreation questionnaire survey report, including evidence of consultation, with FERC concurrently with the Form 80 Report filing.

Forest Service condition 37 specifies that NID conduct recreation survey and monitoring as follows:

- NID would conduct recreation monitoring on NFS land once every 6 years that would include evaluation of resource effects from developed and dispersed use, including evidence of garbage and human waste left onsite. The Forest Service would be involved in the evaluation of resource effects on NFS lands.

- NID would conduct occupancy surveys of project facilities on NFS land on a 3- and/or 6-year cycle as described in the Drum-Spaulding and Yuba-Bear Recreation Trigger Plan (attached to the Forest Service 4 (e) conditions for the project). This Trigger Plan is a detailed plan that includes monitoring indicators, methods, triggers, and actions for hosted/reservation campgrounds and self-pay/no-host campgrounds, day-use facilities, and primitive campsites (the Trigger Plan is almost identical to the one specified for the Drum-Spaulding Project, except that each Trigger Plan is project-specific and includes a description of new facilities to be constructed when implementation triggers are met).
- NID would conduct a recreation user survey on NFS land once every 12 years. The first visitor survey would be conducted in the first Form 80 reporting year following license issuance. Survey methods and questions would be reviewed and approved by the Forest Service in advance, and survey information would be reviewed by the Forest Service.
- At 6 and 12 years after license issuance, NID would prepare the recreation monitoring and survey report, which would be provided to the Forest Service for review, comment, and approval prior to filing with the Commission. Both the 6- and 12-year recreation monitoring and survey reports would incorporate data from the information listed above; traffic counters; other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, and project patrol reports; and other applicable information. NID would file a recreation resources report in compliance with the regulations at 18 CFR §8.11, or as amended.

Forest Service condition 37 specifies that within 1 year of submission of the recreation resources report, NID would consult with the Forest Service to review this report and propose appropriate management actions.

California Fish and Wildlife's 10(j) recommendation 12 is generally the same as Forest Service condition 37 except that California Fish and Wildlife's recommendation does not limit the recreation monitoring to NFS land and includes BLM in addition to the Forest Service. California Fish and Wildlife recommends that NID conduct occupancy surveys of all project recreation facilities on a 6-year cycle.

NID's Alternative Recreation Plan outlines an alternative to the recreation monitoring program specified by Forest Service condition 37 that is similar to the one outlined in NID's proposed Recreation Plan. NID's Alternative Recreation Plan includes, as part of ongoing annual O&M activities, an additional component to monitor the presence of trash and human waste at all project recreation facilities that lack trash or restroom facilities. NID's alternative condition Recreation Plan includes a reference to the Forest Service condition for the detailed Trigger Plan that outlines future development triggers. Additionally, NID's alternative condition Recreation Plan proposes that the 6-year comprehensive project recreational use report would also include a summary of identified recurrent dispersed recreation sites. NID's alternative condition Recreation Plan proposes that NID would meet with the Forest Service, BLM, and any other applicable land management agencies during the 60-day review period to discuss potential reasonable resource management measures on the respective land management agency's lands based on the report results.

BLM condition 30 is generally identical to Forest Service condition 37, with the addition of the following:

- BLM does not limit the recreation monitoring or recreation user survey to recreation facilities on NFS land, but does not specify whether the recreation monitoring would be on BLM land or at all project recreation facilities;

- NID would conduct occupancy surveys of all project facilities on a 6-year cycle for Dutch Flat afterbay and the Chicago Park recreation area near Chicago Park powerhouse;

Our Analysis—Recreational use at the project is expected to increase by about 23 percent over the next 30 years. The level and type of recreational use and recreation user preferences could change over the term of a new license. Regular monitoring of recreational use, surveying recreation users, and assessing facility capacity and recreation demand would help to determine whether the project's recreation facilities meet demand and visitor needs over the term of the license, and whether recreational use is affecting other resources at the project. The recreation monitoring measures included in NID's proposed Recreation Plan, specified by the Forest Service and BLM, and recommended by California Fish and Wildlife would all meet the same overall goals.

Conducting recreation monitoring at all project facilities as proposed by NID and recommended by California Fish and Wildlife would be appropriate to provide project-wide information. The schedule for occupancy surveys as specified by the Forest Service would be more frequent than the Commission's standard license requirement. The Commission's standard license requirement is sufficient for tracking changes in project use and condition over the term of a new license. BLM specifies a survey schedule consistent with NID and California Fish and Wildlife. The proposed reports would provide the means to document the survey information and monitor other recreational management provisions, such as litter and human waste monitoring. Reporting the recreation monitoring results every 6 and 12 years concurrent with the Commission's Form 80 Report schedule would ensure that the Commission is updated on recreational use at the project.

Recreation Development Review

Forest Service condition 39 specifies that NID and the Forest Service would meet at least once every 6 years to review all project recreation facilities and to agree on necessary maintenance, rehabilitation, construction, and reconstruction work and its timing. Following the review, NID would develop a 6-year schedule for maintenance, rehabilitation, and reconstruction, which would be approved by Forest Service prior to being filed with the Commission.

California Fish and Wildlife 10(a) recommendation 14 is identical to Forest Service condition 39, with the inclusion of BLM in the review process in addition to the Forest Service.

NID's Alternative Recreation Plan states that NID would implement Forest Service condition 39, *Review of Recreation Developments*.

BLM condition 39 is identical to Forest Service condition 39, except that it replaces the Forest Service with BLM for the review process.

Our Analysis—Discussing all project recreation facilities during the recreation development review meeting as specified by the Forest Service and BLM and recommended by California Fish and Wildlife would ensure that reconstruction and rehabilitation activities are scheduled in a coordinated manner. It would also be appropriate for the 6-year schedule that is developed as a result of the recreation review to include all project recreation facilities. There are 208.5 acres of BLM lands within the existing project boundary. The roadside parking for Dutch Flat afterbay and the undeveloped recreational use at Chicago Park forebay occurs on BLM land. Requiring the inclusion of BLM for the review meeting when Dutch Flat afterbay or Chicago Park forebay is discussed would be necessary. However, NID is free to consult with BLM or any other interested stakeholder about its proposed schedule for any recreation facilities. Notifying BLM of the schedule and any proposed work in the vicinity of BLM lands before construction begins would ensure that BLM is kept apprised of any work that could affect BLM lands.

Project Patrols/Law Enforcement

The Forest Service specifies that NID coordinate, within 1 year of license issuance, with the Forest Service and BLM to develop a plan to address the costs of managing project-related recreation on NFS and BLM lands. The plan would address, among other items, (1) patrolling or providing for patrols through fire season by personnel that have the ability to extinguish abandoned and escaped campfires, and perform fire prevention duties; (2) providing for patrols, through the recreation season (including the peak season and the shoulder season); and (3) patrolling dispersed public use areas within one-quarter mile of all project reservoirs and project-affected waterways.

NID's alternative condition proposes to monitor dispersed recreation within the project boundary and document any dispersed (nondesignated) recreation sites that occur over the course of the open season as part of NID's regular O&M patrols.

BLM condition 35 specifies that, beginning 90 days after license issuance, NID enter into a recreation O&M agreement to provide \$30,000 annually to BLM for operation, maintenance, law enforcement patrolling, and administration in accordance with the Recreation Plan. In addition, BLM condition 37 specifies that NID would coordinate within 1 year of license issuance with BLM to develop a plan to address the costs of managing project-related recreation on BLM lands. This component is the same as the Forest Service provision, except that it does not include coordination with the Forest Service.

California Fish and Wildlife includes provisions in its 10(j) recommendation 17 to address project patrols that are identical to those included in the Forest Service condition 41. California Fish and Wildlife also recommends a provision identical to the Forest Service for NID to coordinate with the Forest Service to develop a plan to address the costs of managing project-related recreation on NFS and BLM lands that is identical to the provision specified by the Forest Service.

Placer County recommends that NID contribute to the costs of increased county services resulting from the proposed project, such as law enforcement at the new campground at Lake Valley reservoir within Placer County. Placer County notes that NID and the County are trying to reach an agreement; however, if this agreement is not reached, NID should be required by the new license to compensate Placer County for the costs of any increased county services that have a nexus to the project.

Our Analysis—Project patrol provisions would help encourage visitors, including campground users, OHV users, anglers, and boaters, to comply with regulations and project rules. A projected increase in the number of visitors over the term of the new license would likely increase the need for public services, including law enforcement and fire protection, which are provided by the Sheriff's offices in Nevada, Sierra, and Placer Counties. A project patrol person would help reduce conflicts between recreation users and improve visitor safety by providing an authoritative presence to encourage compliance with regulations and project rules. Additional project patrols at the more remote areas of the project would improve management of environmental resources by increasing visitor contact with enforcement agencies and help to educate visitors about appropriate and restricted uses.

However, within the project area, public safety and law enforcement duties are the responsibility of the Sheriff's offices in Nevada, Sierra, and Placer Counties, the California Highway Patrol, and federal agencies on federal lands. NID already provides law enforcement funding through public land use fees that it pays for the project. Further, Forest Service law enforcement personnel from the Tahoe National Forest and BLM personnel are responsible for enforcing regulations related to the management of NFS and BLM lands and resources. The Commission has no way of ensuring that the hiring of a patrol person paid for by NID (in this case staffing or funding a seasonal or year-round employee) or providing funding to the Forest Service, BLM, or Placer County would accomplish a project purpose or ameliorate a project effect. However, the Commission can enforce specific measurable actions, such as O&M

provisions, including maintenance of project lands and project recreation facilities to address fire safety and vandalism, and other associated potential effects of dispersed recreation use within the project boundary. While improved implementation of Forest Service and Nevada, Sierra, and Placer County standards and guidelines regarding recreational use would be beneficial, enforcement of those regulations would be outside the Commission's jurisdiction.

Although Forest Service condition 41, and California Fish and Wildlife's 10(j) recommendation 17 indicate that NID develop a plan to provide funding for the Forest Service to provide patrols, maintain the project recreation facilities, and provide law enforcement, this mechanism would not relieve NID of its responsibility and, therefore, would not be a necessary measure to include in the Recreation Plan.

Public Information, Signage, and Education

NID proposes to replace all existing entrance signs, directional signs within facilities, directional signs to and from facilities, information/bulletin signs and trailhead signs, as needed. NID would replace a sign with a sign of a similar design and at least to the same construction as currently exist.

At facilities on NFS land, NID would coordinate with the Forest Service on the placement of all signs, including the placement of the Forest Service logo on the signs. Additionally, NID proposes to provide consistent signage at all project information boards at project recreation facilities that would include, at a minimum: a map including area project recreation opportunities, emergency contact information, and applicable water surface regulations. Within 5 years of FERC approval of the Recreation Plan, NID would install consistent signage at all project recreation facilities. At facilities on NFS land, NID would provide this information to the appropriate resource agency for review and comment prior to installation. NID would develop consistent information for the signage within 2 years of FERC approval of the Recreation Plan. In addition, NID proposes to provide signage provided by California Fish and Wildlife and/or the Forest Service at specific project reservoirs where public education information is needed to reduce the spread of amphibian chytrid fungus.

The Forest Service specifies that within 2 years of license issuance, NID would, in coordination with the Forest Service, develop an information strategy that includes maps, signs, brochures, and a website(s) to provide information to enhance project recreation opportunities, and protect and interpret the area's natural and cultural resources. This strategy would include the information displays at each project recreation facility. At recreation sites located on project reservoirs, within 1 year of license issuance, NID would provide signs addressing lake surface regulations. Within 2 years of license issuance, NID would provide information at all information kiosks and boat launches about how the public can help prevent the spread of amphibian chytrid fungus and other waterborne pathogens at the project. An implementation schedule would be part of this strategy, with all actions implemented within 5 years of the license issuance.

California Fish and Wildlife includes provisions in its 10(j) measure 16 to address public information and education that are identical to those included in Forest Service condition 41.

NID's alternative condition Recreation Plan includes several provisions related to information boards and public information that are identical to those included in the proposed Recreation Plan.

Our Analysis—Visitors routinely use websites and visitor information boards to acquire information about developed recreation facilities and recreation resources to plan their visits. Providing a public website and signs for these venues that depict recreation resource, water resource, and resource protection information as the Forest Service specifies would increase visitor awareness of opportunities available at and near the project. Both NID's proposed Recreation Plan and the Forest Service provision

would meet this need. Because the project has an extensive footprint and spans multiple land jurisdictions it would be appropriate to consult with all affected agencies to develop the brochure specified by the Forest Service. For the brochure to be useful, it would necessarily include non-project information for context and visitor orientation and require significant effort to develop. Signs in combination with a public website would be just as effective and a less expensive method of providing the necessary information to the public. It would be appropriate periodically to review signage, maps, and public website information.

Development and implementation of consistent signage at the project, as proposed by NID and specified by the Forest Service, would provide the means for a coordinated and systematic development of signage and interpretative information associated with the project.

Whitewater Boating

NID proposes several streamflow measures that would enhance whitewater boating at the project. As discussed in section 3.3.2.2, *Aquatic Resources*, NID proposes to implement a schedule of flow reductions during spill cessation at Milton diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay dam to minimize flow fluctuations in the South Yuba River, Canyon Creek, and Bear River (YB-AQR1 Part 7, *Milton Diversion Dam, Bowman-Spaulding Diversion Dam and Dutch Flat afterbay Dam Spill Cessation Schedules and Minimization of Flow Fluctuations*). The first 6 days of the Milton diversion dam spill cessation schedule would also provide flows for whitewater boating as proposed by NID's measure YB-RR4. NID proposes the following specific measures to enhance whitewater boating:

- YB-RR4, *Milton Diversion Dam Supplemental Flows for Whitewater Boating*—In the Middle Yuba River downstream of Milton diversion dam, NID proposes to provide a continuous mean daily target streamflow of 300 cfs for at least 6 continuous days after May 1 in any years in which spill at Milton diversion dam is 300 cfs or greater after May 1.
- YB-RR3, *French Dam Supplemental Flows for Whitewater Boating*—In all water year types in Canyon Creek below French dam, NID proposes to provide a target streamflow of between 120 and 150 cfs over a continuous 24-hour period starting between September 1 and September 30 of each year, until French Lake elevation reaches 6,638 feet msl.
- YB-RR5, *Bowman-Spaulding Diversion Dam Supplemental Flows for Whitewater Boating*—In Canyon Creek downstream of the Bowman-Spaulding diversion dam, NID proposes to provide a continuous mean daily target streamflow of 275 cfs for at least 5 continuous days after April 1 in any years in which flow is 275 cfs or greater.

NID proposes to provide 7-day advance notice to the public of the beginning and ending date of each event described in measures YB-RR3, YB-RR4, and YB-RR-5.

Forest Service condition 29, BLM condition 7, and California Fish and Wildlife's 10(j) recommendation 2.7 are consistent with NID's proposed measures YB-RR4 and YB-RR5.

The Foothills Water Network supports NID's measures to provide recreational flows. The Foothills Water Network comments that NID's measures to provide whitewater boating flow releases would improve whitewater boating opportunities in Canyon Creek by making flows more predictable and less erratic, would provide substantial improvement in whitewater boating opportunities in the Middle Fork Yuba River below Milton diversion dam, and would provide would provide a late season whitewater boating opportunity in Canyon Creek below French Lake.

Our Analysis—NID’s proposed measures to provide recreation-specific flows, in addition to NID’s proposed streamflows, would generally maintain or enhance existing whitewater boating opportunities available at the project.

Two whitewater boating runs in the reach below Milton diversion dam were identified during the studies conducted during relicensing. NID’s proposed measures would generally maintain or enhance boating opportunities in these whitewater boating runs. In the run from Milton diversion dam to Plumbago, NID’s proposed measures would generally maintain boating opportunities for hardshell kayaks as compared to the no-action alternative in all water year types, except for wet water year types when the no-action alternative would result in a few more days. In the run from Plumbago to Our House diversion dam, NID’s proposed measures would generally maintain boating opportunities for hardshell and inflatable kayaks and rafts as compared to the no-action alternative in all water year types. Although NID’s proposed measures would result in about 7 fewer days for whitewater boating in wet water year types for rafts, they would substantially increase (about 29 days) boating opportunities for inflatable kayaks in critically dry and extreme critically dry water year types.

NID identified Canyon Creek below French Lake and Faucherie Lake dams as whitewater boating runs during the studies conducted during relicensing. NID’s proposed measure would result in a substantial increase in boating opportunities as compared to the no-action alternative in all water year types for hardshell kayaks in Canyon Creek below French Lake dam and below Faucherie Lake dam. Most of these opportunities would occur in September.

Recreation Flow Information

NID proposes to provide mean daily streamflow information to the public via the internet (may be accomplished through a third party) from May 1 through November 30 (measure YB-RR2, *Provide Recreation Flow Information*). NID proposes to provide streamflow information for the Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman dam, and Bear River below Rollins dam. NID proposes to provide reservoir storage for Jackson Meadows reservoir, and French, Faucherie, Sawmill, Jackson, Bowman, and Rollins Lakes.

The Foothills Water Network recommends that NID continue current, year-round operations at the existing streamflow gages. Annual flow information taken at historic locations is important for scientific purposes and promoting understanding of the watershed, and is also utilized by numerous types of recreationists, including whitewater boaters and anglers. The Foothills Water Network also recommends that a gage be added below the confluence of Canyon Creek on the South Fork Yuba River to allow the public to see the combined effect of flow measures on these reaches.

In its reply to the Foothills Water Network’s comments, NID reported that subsequent conversations with American Whitewater confirmed that the Foothills Water Network would be satisfied with the same level of information that is currently provided. NID currently provides information to the public for the stream reaches and reservoirs proposed in measure YB-RR2 and proposes to continue providing this information. NID does not specify where this information is provided.

Our Analysis—Providing year-round mean daily streamflow data on the internet for three stream reaches, as NID proposes, would allow boaters to take advantage of suitable boating flows provided by the project and enable anglers to access recent streamflow conditions. Because the streamflows are affected by special events, reservoir spill, and outages, providing as much advance notice of these occurrences, their duration, and expected travel time for flows would increase whitewater boating opportunities. The location for a new gage recommended by the Foothills Water Network would be 8.5 miles downstream of the project facilities, and flows at this location are influenced by factors beyond the control of NID. The public can determine recreation opportunities in this stretch of the South Fork

Yuba River through trends from flow information available from NID on Canyon Creek below Bowman dam and from information available from NID on the South Yuba River just below Lake Spaulding dam.

Providing year-round mean daily reservoir elevations for Jackson Meadows reservoir, and Faucherie, Bowman, and Rollins Lakes on the internet would allow visitors to know if the formal boat ramps at Jackson Meadows and Rollins are accessible and the conditions at the informal boat ramps at Faucherie and Bowman Lakes before traveling to project reservoirs. There are no formal boat ramps at Sawmill, Jackson, and French Lakes. During the relicensing studies, most visitors at Sawmill and French Lakes indicated that reservoir levels were not an issue or they had no opinion. Providing mean daily reservoir elevation, as NID proposes, combined with informing the public whether the ramps are currently functional, would provide sufficient information to allow visitors to plan their trips.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA as amended requires the Commission to take into account the effects of licensing a hydropower project on any historic properties and allows the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment if any adverse effects to historic properties are identified within the hydropower project's area of potential effects (APE).

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion on the National Register. In this document, we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing on the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources need enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archeological sites may not have enough contextual integrity to be considered eligible. Traditional cultural properties (TCPs) are a type of historic property eligible for the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history; or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998).

Section 106 requires that the Commission seek concurrence with the California SHPO on any finding involving effects or no effects on historic properties and allow the Advisory Council an opportunity to comment. If Native American properties have been identified, section 106 also requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties (i.e., TCPs).

Because existing and potential adverse effects have been identified on historic properties, PG&E and NID developed HPMPs to seek to avoid, reduce, or mitigate the effects. Potential effects that may be associated with a hydroelectric project include any project-related effects associated with the day-to-day O&M of the project after issuance of a new license. During development of the HPMPs, the applicants consulted with the Commission, Advisory Council, California SHPO, Native American tribes, Forest Service, and BLM. The Drum-Spaulding and Yuba-Bear HPMPs would be implemented by execution of a PA that will be signed by the Commission, Advisory Council (if it chooses to participate), California SHPO, and other consulting parties. PG&E filed the Drum-Spaulding final HPMP with FERC on September 25, 2012. NID filed the Yuba-Bear final HPMP with FERC on November 15, 2012.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by a proposed new license within a project's APE. The APE is determined in consultation with the California SHPO and is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the APEs for the Drum-Spaulding and Yuba-Bear Projects include all lands within the respective project boundaries, plus lands outside the project boundary where project operations may affect the character or use of historic properties.

The APEs for the proposed projects have been identified by the Commission as the land within the proposed FERC boundary. For PG&E the Drum-Spaulding APE encompasses about 6,297.27 acres. For NID the Yuba-Bear APE encompasses about 7,015 acres.

In addition, the initial project APE boundaries were subsequently modified to include the following:

- A 100-foot radius surrounding communication towers (i.e., Signal Peak tower for the Drum-Spaulding Project and Quartz Hill tower for the Yuba-Bear Project);
- A 100-foot radius surrounding any other facility related to the O&M of the Yuba-Bear Project (e.g., maintenance buildings directly related to O&M associated with the project boundary);
- 200 feet above the high waterline around project lakes and reservoirs, or the project boundary, whichever is greater;
- For the Drum-Spaulding Project, an additional 12.82 linear miles of access roads and 98.54 acres of recreation areas;
- For the Drum-Spaulding Project, an additional 23.41 acres of land added in late 2010; and
- For the Yuba-Bear Project, segments of two newly designated primary project access roads at Chicago Park and French Lake, as well as the removal of 358.2 acres of land and the addition of 263.26 acres of land.

Cultural History Overview

Archival research conducted as part of the relicensing effort provided background information relevant to understanding past lifeways and cultural sequences, and historic period developments within and adjacent to the projects. Based on this gathered background information, a cultural context was formulated and is provided below (as provided in PG&E, 2011d and 2011e; NID, 2011d and 2011e).

Most early archeological work in the northern Sierra Nevada, with the exception of the Lake Tahoe area, was conducted at the lower to middle elevations along the major rivers draining the western Sierran slope, including: the North Yuba, Middle Yuba, and South Yuba Rivers; the Bear River; and the North and Middle Forks of the American River. Other rivers and numerous tributaries feed these rivers, depositing water into various bodies on both sides of the Sierran crest (Markley and Henton, 1985).

Evidence from previous investigations suggests that occupation of the northern Sierra Nevada foothills and upper slopes included sporadic seasonal visits by Pre-Archaic people whose major settlements were focused on the lush lakeshore and streamside environments found farther east of Lake

Tahoe, around the pluvial lakes of the Great Basin, or farther west in the Sacramento and San Joaquin valleys. Work by W.A. Davis and R. Elston (Moratto, 2004) identified cultural components that demonstrated prehistoric human occupation of the region for a period extending about 7,000 years (Elston, 1971).

The earliest human occupation of the region is identified as Clovis culture that is currently identified in North America as occurring between about 13,500 to 13,000 years before present (BP). Clovis culture is distinguished by “fluted” projectile points, percussion blades, and other distinctive artifacts. Very few Clovis sites have been identified in North America. No diagnostic Clovis artifacts have been found in the vicinity of the projects. Fluted point fragments and complete specimens, typically isolated, are, however, known from scattered locations throughout much of the Sierra (cf., Rondeau and Dougherty, 2009).

The Pleistocene ended 10,000 years ago in the sense that the great continental ice sheets were in serious retreat. However, modern studies using data from Antarctic and Greenland ice cores have shown that the great glacial advances of the Pleistocene were at least quasi-periodic with a cycle length ranging from about 110 to over 150,000 years. There is no certainty at present whether the Pleistocene has really ended or if the Holocene is merely the latest interstadial event with more ice to come in the future. Cultural evidence from this era in the Sierra Nevada is scant, but comparatively well established. Lindstrom et al. (2007) note the “Pre-Archaic/Tahoe Reach phase,” marked by large stemmed points resembling weapons from the Great Basin from this era, which occurred in the vicinity of the projects.

By the Early Holocene (about 10,000 to 8,000 BP), evidence from numerous archeological sites throughout California indicates that the region was fully explored by this time and supported a significant population. The regional climate was distinguished by a steady warming-and-drying trend or a period of “relative warming . . .” (cf. Lindstrom et al., 2007). In the Truckee area, the Alder Hill basalt quarry was active. McGuire et al. (2006) recovered Great Basin stemmed points, datable carbon, and obsidian; these artifacts indicate that the area was being visited for tool stone manufacture during the Early Holocene. Lindstrom et al. (2007) also note that at CA-ELD-180, Great Basin stemmed points (some of which likely had their origins in the western Sierra foothills) manufactured from a broad range of materials indicate considerable mobility of at least portions of the human population. In yet other areas, such as the western Sierra foothills in Calaveras County, there is evidence of extremely stable land use. At the Skyrocket site, evidence shows continued use of the same location over a span of about 2,500 years during the Early Holocene (Fagan, 2003). It is quite possible that similar remains may be present near the project areas at lower elevations.

The Middle Holocene/Early Archaic (about 8,000 to 5,000 BP) is poorly represented archaeologically throughout California. Lindstrom et al. (2007) remark on this issue, speculating that several factors may obscure Middle Holocene contexts. Warming conditions arising during the early Holocene evidently continued into the mid-Holocene. In the Tahoe region, Lindstrom et al. (2007) cite an extensive list of studies, all of which have concluded that the mid-Holocene was the warmest period in recent geological history and, at least in North America, one of the driest periods. Levels in Lake Tahoe may at times have fallen sufficiently low to isolate the lake from the Truckee River. Lindstrom et al. (2007) note evidence of a drought period estimated to have lasted about 350 years between 6,300 and 4,850 BP. Effects of these changes farther west are not well documented. Again, at the Skyrocket site in Calaveras County, evidence of occupation diminishes, but is never fully interrupted (Fagan, 2003).

Middle Holocene occupation in the vicinity of the projects is represented by the Tahoe Reach and Spooner phases, which are associated with occupation during the Altithermal climatic period. The Tahoe Reach phase is defined by buried archeological deposits and the presence of Parman projectile points and nondiagnostic artifacts dating to $8,130 \pm 130$ years BP. The Spooner I period (5,150 to 2,970 BC) is

followed by the Spooner II period (1,100 BC to AD 60), the Spooner III period (AD 60 to AD 1385), and the Spooner IV period (AD 1385 to the historic era). The Tahoe Reach phase and the Spooner period are associated with occupation during the Altithermal climatic period. The Spooner II period is marked by milling equipment and Elko, Rose Spring, and Martis projectile point styles, which continue through the Spooner III period with the addition of cobble manos, drills, and Eastgate, Cottonwood, and Desert Side-notched projectile points. The Spooner IV period is represented in materials associated with a winter village associated with the protohistoric Washoe. Components dating between 5,000 and 3,000 BC are relatively rare, and little is known about prehistoric lifeways during this interval. However, flat slab milling stones, loaf-shaped manos, and large foliate and corner-notched projectiles are the elements that have been associated with these assemblages.

The beginning of the Late Holocene/Middle Archaic (5,000 to 2,000 BP) is marked by climatic shifts toward a more temperate regime and the first well-documented archeological cultures in central and northern California. In the Sacramento-San Joaquin Delta region, the Windmill culture emerged with unique traits including an unusual mortuary pattern marked by prone interments with crania oriented in a westerly direction (Moratto, 1984). In the Truckee vicinity and portions of the neighboring western high Sierra, the Martis Complex, marked by typological affiliations with the Great Basin and a preference for locally abundant basalt, was identified by Heizer and Elsasser (1953), Elsasser (1960), and Moratto (1984). To the west and north, the Messilla Complex was defined at three sites in Butte County (Moratto, 1984). Moratto (1984), following arguments of earlier investigators, including studies for the proposed Auburn dam and Bullards Bar reservoirs, suggests that the Martis Complex may reflect ancestral Maidu prehistory. By the Middle Archaic, people of the Sierra Nevada show clear influences from both the Great Basin and Central California. However, the archeological remains cannot as yet be reliably attributed to modern ethnographic groups.

The lack of discernible relations between archeological complexes and the known material cultures of ethnographic Californian populations ends with the Late Archaic (2,000 to 200 BP). In the high Sierra, the Martis Complex gives way to the Kings Beach Complex, and in the west Sierra, analogous changes occur as the Middle Horizon is replaced by early Augustine Pattern settlements. In the west, important subsistence changes take place as the acorn clearly emerges as an important staple, a process marked by a proliferation of the use of bedrock mortars. The bow appears as the preeminent weapon, marked archaeologically by an abrupt reduction in projectile point size and a significant increase in numbers of points in use. In the high Sierra, the bow also appears in the Kings Beach Complex, and preferred materials for weapon tips change from basalt to microcrystalline silicate materials (Moratto, 1984).

The projects are within lands claimed ethnographically by the Washoe and Nisenan, or Southern Maidu peoples, of California and Nevada. The high ranges of the Sierra were usable only during the summer months and ethnographic accounts reflect this. The high country was exploited by both Nisenan and Washoe (Beals, 1933; Kroeber, 1976). Washoe sources state that parties for trading, gathering, and collecting regularly crossed the Sierra crest and ranged westward, possibly as far as Auburn in the vicinity of the projects (D'Azevedo, 1986).

The majority of the APE falls on lands attributed ethnographically to the Nisenan people, also referred to as the Southern Maidu (Beals, 1933; Kroeber, 1976; Wilson and Towne, 1978). The Nisenan are speakers of a language closely related to Maidu and Konkow and all are members of the Penutian language family. Penutian languages are estimated to have been spoken by half of California's native population at the time of historic contact (Moratto, 1984). Beals (1933) identified four principal linguistic divisions within Nisenan, but observes that "... every political unit showed slight dialectic differences." Beals (1933) differentiates between valley, hill, and mountain Nisenan dialects and further identifies divisions running east-west that approximate the course of major streams, including one in the vicinity of

the Bear River. Shipley (1978) identified seven Nisenan dialects, classified as Valley Nisenan, Oregon House, Auburn, Clipper Gap, Nevada City, Colfax, and Placerville.

Nisenan society was organized into small, politically independent tribes or tribelets (Kroeber, 1976; Wilson and Towne, 1978). Each political unit consisted of one or more villages and a number of smaller hamlets with populations ranging from about 20 to 100 people (Kroeber, 1976). Nisenan villages were often occupied by some inhabitants year round. Permanent village occupants typically included the infirm or aged members unable to make treks to the higher mountains. Nisenan economy depended extensively on the acorn that was gathered in the fall and stored for later use. However, the Nisenan also hunted and gathered year-round, employing the diverse biotic communities of the western slope of the Sierra Nevada (Hull, 2007). Hunting was done both individually and communally. Communal hunting was accomplished through a variety of methods, including drives and setting fires. Deer, antelope, elk, black bear, wildcats, mountain lions, and other small game were caught and either roasted, baked, or dried. Gathering was a family activity, and group mobility was timed to take advantage of seasonal ripening of specific resources, including roots, wild onion, wild sweet potato, Indian potato, berries, and a variety of nuts, in addition to the acorn. The Nisenan technology was dependent upon naturally occurring materials including stone, bone, shell, wood, plant fiber, and animal products. All tools, clothing, and gear depended upon the acquisition of necessary materials, which were either gathered from natural sources or acquired through trade (such as obsidian, which does not occur in Nisenan territory). Trade and exchange links reached into the Great Basin and west to the Pacific where the only sources of marine shell occur (Hull, 2007; Kroeber, 1976; Wilson and Towne, 1978).

Beals (1933) observes that the land above about 3,500 feet msl was rarely entered by any Nisenan except those from mountain communities bordering the high country and was considered open land. He notes that parties visiting the area in the summer would have rarely spent more than 4 or 5 days in a single camp. Much of the APE falls within this range of "open land" and would have been jointly used by all the people dwelling along its margins.

Neighboring the Nisenan to the east were the Washoe, speakers of a language classified among the Hokan languages of North America. Their core territory centered on montane valleys including the Sierra Valley northeast of the project areas, the Lake Tahoe Basin southeast of the project areas, and Antelope Valley south of Lake Tahoe (D'Azevedo, 1986). The Washoe also claimed an extended range around these core areas with visits reported as far west as Auburn in the vicinity of the projects (D'Azevedo, 1986). The Washoe have been classified as a Californian people by Kroeber (1976). The Washoe language was initially thought to be a unique, isolated language stock; however, linguists now classify it as a member of the widely dispersed Hokan language family. Other Hokan groups are located in northern and southern California and along the California coast (Shipley, 1978).

The Washoe reportedly descended from the northeastern end of the APE to collect acorns along the Bear and Yuba Rivers. They may have also wintered on the western slope occasionally, either with Nisenan acquaintances or in small camps (D'Azevedo, 1986; Peters, 1988). Ethnographic accounts indicate a somewhat looser social organization among the Washoe than among the Nisenan, with less emphasis on suprafamilial relationships (D'Azevedo, 1986). Conflict with neighboring groups was infrequent and probable external relations cannot be thoroughly evaluated due to the sparse nature of ethnographic information. D'Azevedo (1986) summarizes the relations of the Washoe with their neighbors as generally peaceable. Beals (1933) also notes friendly relationships between Nisenan dwelling in the vicinity of the projects and the Washoe.

Washoe technology and subsistence, like that of the Nisenan, was dependent upon the natural production and use of regionally available materials including wood, bone, stone, and fiber. These materials occurred throughout their territory or were obtained through exchange or trade, like marine

shell. The eastern Sierra supported populations of bighorn sheep, mule deer, antelope, and the ubiquitous black-tailed jackrabbit, while the major streams contained significant populations of trout species, all of economic importance to the Washoe. D'Azevedo (1986) states that the majority of the Washoe tended to remain near their home ranges, wintering together and dispersing into smaller mobile groups in the spring and summer. Some small groups with specific purposes likely penetrated the higher ranges and western slopes of the Sierra for specific plants or animals or perhaps for trade purposes with the mountain Nisenan (Beals, 1933; D'Azevedo, 1986).

While there were definite differences between the Washoe and the Nisenan in concepts of land tenure, these would have had little effect in the use of the Sierran regions above 3,500 feet msl. With observation of proper etiquette, areas to the west would also have been open to Washoe use (D'Azevedo, 1986).

Although contact with Europeans began with the coastal explorations by Spain during the mid-sixteenth century, the effect of European presence did not become evident until arrival of Spanish missionaries in 1769. That year initiated a period—extending into the early nineteenth century—during which missionaries implemented a process to aggregate and colonize the native inhabitants through the institutions of missions, presidios, and pueblos. The missionaries' colonizing efforts greatly affected the demography, social life, and culture of the indigenous people.

Travelers and explorers in the early nineteenth century would have encountered the Maidu, Nisenan (Southern Maidu), and Washoe living within their traditional territories. However, traditional ways of life had been deeply disrupted by disease, wars with military expeditions, enslavement, and relocation that attended Euro-American occupation of the region in the nineteenth century. Nisenan, Maidu, and Washoe communities were displaced from their lands by miners, ranchers, and others seeking to extract resources from the region.

With Mexico's independence from Spain in 1821, the missions were gradually secularized as "ranchos" that were dependent on native inhabitants for farming and ranching labor. The U.S. war with Mexico in the mid-1840s resulted in the cession of California in 1848. That same year, discovery of gold initiated Euro-American migration into the region on an enormous scale. There soon emerged a need for food, shelter, and the infrastructure that accompanies thousands of people in a developing area. Immigrants from Europe, Asia, and elsewhere followed the miners to the gold fields to grow crops, raise cattle, harvest timber, and build towns. Roads were built over the Sierra Nevada, often following trails used by native populations for millennia.

The advent of the Gold Rush in 1849 had catastrophic effects on the Nisenan and the Washoe. While the hill and mountain Nisenan were little affected by the epidemics that raged through the Central Valley in the 1830s, the discovery of gold in their homeland was another matter. Miners descended on the region in a chaotic and frequently violent mix. The Nisenan had to abandon their traditional ways of survival to work as laborers, loggers, and ranch hands (Wilson and Towne, 1978). At the same time that they were attempting to deal with expulsion from their own lands and the loss of their means of survival, the indigenous people of California had to deal with neglect from federal and state governments that were at best apathetic and at worst hostile.

The effects of historic settlement upon the Washoe were different in detail, but socially and culturally just as catastrophic. Washoe social organization, as noted previously, was focused largely on familial level structures and supra-familial organizations—e.g., tribal structures were unfamiliar, yet non-native society expected and demanded "chiefs" who could speak for larger groups, and where the Washoe lacked them, American society forced leaders upon them. As settlement in California and Nevada proceeded, the Washoe were treated as trespassers on their core lands. Traditional fishing practices

around Lake Tahoe, for instance, were suppressed, and the Washoe were excluded from the resources of the lake and Truckee River. Although in the later nineteenth century Washoe leaders petitioned Washington, D.C., regarding fishery depletion and other matters, they received little but promises. As with the Nisenan, the Washoe, for survival's sake, found that they must assume roles in the dominant society, taking up jobs in ranching, logging, and similar pursuits. At the present, both the Nisenan and the Washoe are actively working to preserve and strengthen their societies (D'Azevedo, 1986; Wilson and Towne, 1978).

The Yuba, Bear, and American drainages intersect a number of historic period mining districts, in which an elaborate network of ditches and flumes were built, beginning in the mid-nineteenth century, to provide power for miners. As the call for hydraulic power increased, so did the size of the ditches, at first providing water for placer mining and later to the expanding agriculture of the region. Grazing emerged as one of the biggest industries in the area and surrounding vicinity, even as the gold rush began to decline. The many unsettled areas of the Sierra Nevada and foothills drew cattlemen, who were soon followed by sheepherders, including a significant number of Basques. In the 1890s, logging, which had begun in the area in the mid-nineteenth century, became a major extractive activity by the American River Land and Lumber Company and successor companies until the Great Depression.

The Drum-Spaulding Project was the first major hydroelectric project for PG&E and was instrumental in the development of long-distance transmission, representing a major construction effort. The project was designed to develop the Yuba and Bear Rivers for water supply and electric power. Numerous mining ditch companies have been involved with the evolution of portions of the water delivery and storage system, beginning in the 1850s. Engineers Frank G. Baum and James H. Wise laid the plans for the system in 1905 after surveying the new acquisition. Seven years later crews of men, machines, and horses went to work. Their vision became a reality within a decade and continues today as a major component of PG&E's hydroelectric power system (Coleman, 1952).

The Drum-Spaulding Project is comprised of a series of developments, some constructed by PG&E and some by its predecessors. The project can logically be divided into systems that reflect different construction efforts and time periods. These systems include the Deer Creek Powerhouse System, the Alta Powerhouse System, the Dutch Flat Powerhouse, and the Drum-Spaulding Powerhouse System.

The Drum-Spaulding Project consists of 90 built environment resources (one of these is the Drum-Spaulding Hydroelectric Historic District), including powerhouses, on-stream dams with reservoirs, off-stream impoundments, diversion dams, associated canal, tunnels, ditches, an overhead transmission line, and other features. Today the project, as a whole, reflects the design conceived, surveyed, and engineered by Frank Baum and James Wise. Earlier elements of the project, such as dams, some dating to the 1850s (pre-PG&E), were either completely rebuilt or remodeled. Throughout the last 50 years, powerhouses, dams, and other water control and conveyance features have been added, updated, and removed as economic and technological considerations have allowed.

Development of the Yuba-Bear Project stems back to the early 1900s when community leaders sought to acquire new water rights and acquisitioned abandoned mining features (i.e., reservoirs, canals, etc.) from the California Gold Rush to form a public water system (NID, 2007). A group of southeastern Nevada County farmers and orchardists, who formed the Irrigation Club in 1915, filed a water rights application on the Upper Canyon Creek, beyond Bowman Lake (Jackson et al., 1982). On August 5, 1921, voters elected to form a new water district, which was approved by the Nevada County Supervisors. NID was officially established on August 15, 1921, and began supplying local farms with irrigation water shortly thereafter. In 1962, voters supported a \$65 million bond issue to construct the Yuba-Bear Hydroelectric Project, which was built between 1963 and 1966. This resulted in new power generation

capabilities and new reservoirs and canal systems, and also created an additional 145,000 acre-feet of water storage for district residents. Two additional powerhouses were added to the project in the 1980s.

The abandoned mining features used to form the water system initially belonged to numerous mining ditch companies that, beginning in the 1850s, were involved in the evolution of the core water delivery system. However, today's project system as a whole reflects a design conceived, surveyed, and engineered by NID in the 1910s, constructed in the 1920s, and then completely redesigned in the 1960s (Baker, 2010). Throughout the past 150 years, dams and other water control and conveyance features have been significantly updated as economic and technological considerations have allowed. The Yuba system of the project uses diversions along tributary creeks and regulatory reservoirs combined with conveyance features, such as tunnels, flumes, and ditches. Perhaps its most noted feature is the Bowman House, built by NID as part of California's State Emergency Relief Administration during the Great Depression of the 1930s.

Previous Cultural Resource Investigations

In 2007, the applicants performed records searches at the North Central Information Center, Forest Service, Tahoe National Forest, and BLM. The searches identified previous cultural resources surveys and previously recorded archeological and historic-era resources within or directly adjacent to the project APEs. In addition to identifying previously documented cultural resources, the research also provided background information on the archaeology, history, and ethnohistory of the area that could be used to help formulate a cultural context for the project vicinity. The record searches included all lands within the existing project boundaries plus an additional 0.25-mile buffer beyond the boundaries. Cultural resources records and site location maps, Government Land Office maps, the National Register, California Register of Historical Resources, Office of Historic Preservation Historic Property Directory, 1996 California State Historic Landmarks, 1976 California Inventory of Historic Resources, and Caltrans Bridge Inventory were reviewed during the records searches.

For the Drum Spaulding Project, PG&E conducted additional archival research in 2009 at the following locations: PG&E archives in San Bruno, California; PG&E photo archives in San Francisco, California; Nevada County Historical Society archives in Nevada City; and the California State Library, Government Publications in Sacramento. NID conducted additional archival research in 2008 at the following locations: PG&E archives in San Bruno, California; PG&E photo archives in San Francisco, California; NID's archives in Grass Valley, California; NID archives in Colfax, California; and California State Library, Government Publications. This research was completed to obtain additional information specific to the prehistory and history of the project vicinity, the hydroelectric system as a whole, and the individual features of the systems. The research included contacting PG&E and NID employees, as appropriate, to gather feature-specific information.

In 2009, PG&E conducted a second record search at Tahoe National Forest and the North Central Information Center to gather new material not available in 2007 and to expand the records search for new areas not originally included in the APE. In 2010, PG&E conducted additional archival research to facilitate National Register eligibility evaluations of cultural resources identified within the APE. The following repositories are among those visited to acquire the needed information: PG&E archives in San Bruno and San Francisco, California; PG&E archives in Auburn at the Alta Service Center; Bancroft Library, University of California, Berkeley; Placer County Archives and Museum, Auburn, California; Nevada County Historical Society's Searles Library, the Assessment Office, and the Recorder's Office, all in Nevada City, California; and the California State Library in Sacramento, California. Research also was performed through oral histories provided by local historians.

PG&E identified 233 previous cultural resource investigations within the archival research data-gathering area (the APE plus a 0.25-mile buffer around the APE). Of these, 197 studies are within the

APE. About 50 percent of these surveys occurred more than 10 years ago; the reports of investigation associated with these surveys either provided insufficient information to determine the adequacy of the coverage employed, or described a survey coverage methodology that was overly broad and did not fully cover the surveyed areas. The previous archeological survey work conducted within the project's APE documented 52 previously recorded cultural resources and 96 potential historic sites or features (i.e., potential historic-era resources identified on historic maps).

Of the 52 previously recorded sites and/or built environment resources, 36 are historic in age, 12 are prehistoric, and 4 are multicomponent. The prehistoric components include lithic scatters with and without tools, milling stations, one site with evidence of midden deposits, and one site with petroglyphs. The historic components include foundations, roads, ditches, refuse scatters, camps, houses, a town site, dams, canals, trestle remains, quarries, a railroad grade, corrals, penstocks with debris, a wall, ranch remains, and tailings. It was found that the 52 sites included some portions of the project system, which were previously evaluated as eligible for the National Register (Parks, 1990). A National Register historic district including the system was also proposed at that time (Parks, 1990). However, the evaluation was never submitted to the SHPO for concurrence. Additionally, CA-NEV-694, a lithic scatter, was previously evaluated as eligible for listing on the National Register after testing (Macdougall, 1996), though this evaluation was never provided to the SHPO for concurrence. The site was tested again in 2002 by Tahoe National Forest and found eligible (Crawford, 2004); however, again this evaluation was not submitted to the SHPO. The site was reassessed by Tahoe National Forest in 2011 and found ineligible for listing on the National Register due to compromised integrity. The SHPO concurred with this finding in a letter dated September 21, 2011. Also, a small portion of site CA-NEV-693 was determined ineligible, with SHPO concurrence, in 1999 (Macdougall, 1999). Site CA-NEV-693 is an historic town site known as Summit City/Meadow Lake Townsite. The period of occupation is ca. 1863-1970s, with the peak use from 1866-1867. Site P-29-2959, the quarry at Fordyce Lake, was recorded and evaluated as ineligible for inclusion on the National Register in 2004 (Compas). It is unknown if the SHPO concurred with this finding. As well, the Levey Ditch Camp, CA-NEV-434-H, was tested and evaluated in 2009 (Smith), but again, it is unknown if the SHPO concurred. The remaining previously recorded resources remain unevaluated with regard to their National Register eligibility.

For the Yuba-Bear Project, in 2011, NID conducted another records search to obtain information on any previous cultural surveys or recorded archeological and historic properties within the additional acreage added to the APE since 2009. This search encompassed the additional 236.26 acres added to the project APE and did not include a 0.25-mile buffer zone beyond these areas, as the original record searches would have for the most part already covered these areas.

Records searches revealed that 87 cultural resources investigations were conducted within the Yuba-Bear Project study area; 47 of these studies are within the APE. About 73 percent of the previous surveys within the APE occurred more than 10 years ago, were insufficiently intensive, or provided insufficient information in the reports to determine the adequacy of the coverage. Background research further revealed that little was known regarding the development of the Yuba-Bear Project system prior to the current relicensing effort, and that the project and its features had not been adequately addressed in previous surveys or documents, had not been previously recorded, and were not previously evaluated for listing on the National Register. The record searches for the Yuba-Bear Project study area found that the 47 previous archeological investigations within the APE resulted in recording 16 archeological sites and 38 potential historic sites. Of the 16 archeological sites, 11 are located in the Tahoe National Forest, 3 are on private land, 1 is on PG&E land, and 1 is on NID land. Four of the 16 sites have a prehistoric component, 11 have historic components, and 1 is multicomponent (prehistoric and historic). The prehistoric sites are lithic scatters and bedrock mortars; the historic sites are refuse scatters, ditches, a quartz mine, a yellow metal mine, the Bowman Barracks camp site, a residential site, and an earthen reservoir; the multicomponent site includes bedrock mortar and a historic refuse scatter.

One of the 16 previously recorded archeological sites within the Yuba-Bear APE, the Bowman Barracks camp site (P-29-2028/CA-NEV-1324H), was previously evaluated as ineligible for listing on the National Register, and the SHPO concurred with this finding in a letter dated July 26, 2000. The remaining 15 previously recorded sites had not been evaluated for listing on the National Register.

TCP Investigations

From 2006 to 2011, PG&E and NID conducted a study to identify TCPs. The study included contact with the California Native American Heritage Commission (NAHC) for a list of tribes and individuals, who might have an interest in the projects, outreach to both recognized and non-recognized tribes and tribal members, and contacting those individuals and organizations.

The following eight tribal groups have been participants in the relicensing process:

- Colfax-Todds Valley Consolidated Tribe
- Greenville Rancheria of Maidu Indians
- Nisenan Maidu
- Shingle Springs Band of Miwok Indians
- Todds Valley Miwok-Maidu Cultural Foundation
- Tsi-Akim Maidu
- United Auburn Indian Community (UAIC)
- Washoe Tribe of Nevada and California

During the relicensing process, PG&E and NID held more than 33 joint meetings with tribes and agencies, and the applicants' ethnographer conducted interviews with about 30 individuals. PG&E and NID also requested that the NAHC review its Sacred Lands File for any potential resources in the vicinity of the projects. The NAHC did not offer whether or not any sacred lands were in the project areas.

In 2007, the PG&E and NID background review of information described above included identifying previous TCP investigations and previously recorded TCPs within the APE. Additionally, this research was to identify if there were any Indian Trust Assets (i.e., legal interests in assets held in trust by the federal government for Indian tribes or individual Indians) within the project. No previously documented TCPs were identified during the records search, although this is not unusual since few TCPs have been formally documented in California.

PG&E and NID conducted additional archival research for Native American information. In 2009 and 2010, with assistance by tribal members, the following archives were visited or reviewed: California State Library California History Room and Government Publications, the University of California (Berkeley) Bancroft Library, Federal Archives, the Nisenan village research of Sherry Tatsch (2006), and the public library and archives of Nevada, Placer, Plumas, Sierra, and Yuba Counties. The primary John Peabody Harrington data used by Tatsch were researched, keeping a focus on families rather than the late-nineteenth- and early-twentieth-century linguistic data. The research further included examination of the ethnographic records on file at the Yosemite Archives in Yosemite National Park; the University of Nevada, Reno, Special Collections; the Riddell papers at the California State Archives; the Hudson papers from the Field Museum in Chicago; and the Littlejohn and Merriam papers at the University of California Bancroft Library. This additional archival research in 2009 and 2010 found no record of previously documented TCPs.

Field Investigations

Archeological and historic architectural field surveys were completed by PG&E within the Drum-Spaulding Project APE between 2009 and 2011 and by NID within the Yuba-Bear Project APE between July and December 2008. The surveys of the APEs combined verification of data from the earlier surveys and systematic field investigations of locations previously but inadequately surveyed, or those not previously surveyed. These surveys did not include the land above the project tunnels because there are no project operations on the surface at these locations. In 2008, NID completed its study of the Yuba-Bear Project's built environment, and in 2010, PG&E completed its study of the Drum-Spaulding Project's built environment, which included documentation and National Register evaluation of the project system (e.g., powerhouses, dams, switchyards, and conduits).

In general, the field survey strategy used parallel pedestrian transects spaced no greater than 16 to 22 yards (15 to 20 meters) apart. In areas containing intermittent patches of dense vegetation or mixed areas of steep terrain with ledges or flats, where 16- to 22-yard transects were not possible, general coverage was employed. General coverage consisted of transects spaced 22 to 44 yards (20 to 40 meters) apart. Areas within the APE that could not be accessed in a safe manner (e.g., unsafe slopes, certain locations containing dense vegetation) were not surveyed. Lands typically inundated by project reservoirs that had become accessible during the survey season as a result of normal reservoir drawdowns were also examined.

For PG&E field surveys, Alan Wallace (Colfax Nisenan Maidu/Washoe), a representative of the Washoe Tribe of Nevada and California, joined the field crew in the capacity of an archeological technician. Mr. Wallace's knowledge regarding natural resources, Native use of specific plants, and ancestral information imparted at specific sites was incorporated into individual site records, where appropriate. For NID field surveys, members of the Native American community and agencies were invited to accompany the field crews during the surveys. A representative of the Tsi-Akim Maidu Tribe of Taylorsville Rancheria participated in about 50 percent of the archeological field survey for the Yuba-Bear Project. Due to the sensitive nature of the cultural resources information, archeological site records are confidential and are distributed only to the agencies and affected tribes.

Identified Resources

Archeological and Historic Era Resources

Drum-Spaulding Project—PG&E identified 218 archeological sites and 126 isolated artifacts or features within the Drum-Spaulding APE. Of the 218 sites, 164 are newly identified, 53 are sites that were recorded by other investigations and revisited, and 1 site number is assigned to an archeological district. Also, of the 218 sites, 43 are prehistoric in age, 165 are historic, and 10 are multicomponent sites that contain both historic and prehistoric components. The 126 isolated resources found during the survey include prehistoric or historic-era deposits that are not substantial enough to warrant recordation as archeological sites. Isolates are generally sparse in content, containing fewer than 5 or 10 items and/or occur in secondary (redeposited) contexts.

PG&E has preliminarily examined the National Register eligibility of those sites that can be assessed based on archival research and field observations. Sites that could not be assessed are considered potentially eligible pending further research. The National Register eligibility of the 218 archeological and historic-era resources is summarized in table 3-229.

Table 3-229. Summary of the archeological sites and National Register status in the Drum-Spaulding Project APE. (Source: PG&E, 2012b)

National Register Status	Prehistoric Sites	Historic Sites	Multicomponent Sites	Total Number of Sites
Ineligible	11	95	1	107
Potentially Eligible	28	56	9	93
Eligible	4	14	0	18
Total	43	165	10	218

Of the 218 prehistoric, historic, and multicomponent archeological sites within the Drum-Spaulding APE, 107 lack historical importance, have no data potential to contribute to ongoing studies, or have compromised integrity and do not appear to qualify for inclusion on the National Register; 93 have not been formally evaluated and are considered potentially eligible for inclusion on the National Register, pending additional archival, archeological, or comparative research; and 18 appear to be eligible for inclusion on the National Register for their potential to contribute significant information about the prehistory or history of the region.

Prehistoric Site Types

Of the 43 prehistoric sites that were identified within the Drum-Spaulding Project, there are four site types: lithic scatters, bedrock milling stations, occupation sites, and rock art sites (table 3-230). Lithic scatters are the most predominate, representing 60 percent of the prehistoric site types. Lithic artifacts recovered from the project are primarily composed of basalt debitage, projectile points, and bifaces. Some of the sites, particularly around the Peak lakes and Kelly Lake, were characterized by a predominance of cryptocrystalline silicate flakes and tools. Obsidian was occasionally noted but rarely in abundance, usually comprising less than 4 percent of the total artifact assemblage. Milling stations represent 20 percent of the prehistoric sites within the project. These sites ranged from a single mortar cup on a bedrock outcrop with no associated material, to a site with 3 mortar cups and 11 grinding slicks. The average milling station found during the survey contained less than four mortar cups. Occupation and rock art sites documented within the project each represent 9 percent of the prehistoric site types. The occupation sites contained dense quantities of lithic debitage, flaked stone tools, groundstone implements, and, in the case of one of the four sites, a midden deposit (CA-PLA-331). All of the prehistoric occupation sites had associated portable groundstone milling equipment, except for CA-NEV-331, which is located in close proximity to a bedrock milling feature recorded as CA-PLA-2395. CA-NEV-331 was defined as an occupation site by the presence of features that may be house pits and a dance house depression. CA-NEV-694 was also associated with a bedrock milling feature. CA-NEV-694 was previously recorded with associated projectile points; diagnostic artifacts from this site were collected during the initial work. The four rock art sites were found in the high Sierra from elevations of 5,790 to 6,340 feet msl. The petroglyphs are classified as Style 7, following Payen's (1966) and Foster et al.'s (1998) characterization. Sierran Style 7 sites are relatively rare; at the time of the field investigation, only 137 of these sites had been found confined to a 3-county area. The petroglyphs range from just a few elements on a single panel to over 100 elements on 11 panels spread over 5 distinct outcrops of glaciated rock. Two of the rock art sites were newly identified during the survey; 1 of these has over 100 elements on 5 rocks within numerous panels and the other consists of 4 elements on a granite outcrop. The other 2 rock art sites were previously recorded and consist of 20 or fewer elements in several panels. Two of the rock art sites within the project area had associated prehistoric materials.

Table 3-230. Summary of prehistoric site types in the Drum-Spaulding Project APE. (Source: PG&E, 2012b)

Prehistoric Site Type	Number of Sites	Percentage of Prehistoric Site Types
Lithic Scatters	26	60
Bedrock Milling Stations	9	20
Occupation Sites	4	9
Rock Art Sites	4	9
Total	43	98

Historic Site Types

The 165 historic sites identified during the survey represent 10 activity themes (transportation, mining, water conveyance and storage, hydroelectric related, ranching, logging, recreation, settlement, unassociated refuse deposits, and other). Table 3-231 summarizes the 165 historic sites by type. Given the propensity before ca. 1970 for Americans to discard garbage in any rural location, it is not surprising that historical resources, particularly isolated refuse deposits, can occur anywhere in the wooded areas of the project, including roadside disposal. Some thematic sites, such as mining or logging, cluster in response to the presence of a particular natural resource or focused activity area. A summary of the sites that have been categorized into the ten activity themes follows.

Table 3-231. Summary of historic site types in the Drum-Spaulding Project APE. (Source: PG&E, 2012b)

Historic Site Type	Number of Sites	Percentage of Historic Site Types
Transportation	17	10.3
Mining	24	14.5
Water Conveyance and Storage	32	19.4
Hydroelectric Related	39	23.6
Ranching	6	3.6
Logging	6	3.6
Recreation	1	0.6
Settlement	11	6.7
Refuse Deposit	25	15.2
Other	4	2.4
Total	165	99.9

Transportation—Seventeen historic sites are reflective of the region's transportation network. The earliest routes are represented by segments of emigrant trails, such as the Truckee-Donner Trail and the Nevada City Cutoff, which crossed over the high county and through Bear Valley on the way to lower elevations. Remnants of mule trails used by miners to move through rugged country, wagon and toll

roads built to haul freight into the miners, roads related to hydroelectric development, and twentieth-century highway routes were also identified within the APE.

Mining—Twenty-four historic sites were assigned a mining function. Mining sites were defined as sites related to the extraction and processing of minerals. Extraction sites include prospect pits, adits, shafts, sluice mining channels, hydraulic mining waste areas, and stacked rock tailings. One processing site with a stamp mill was recorded (P-29-4043). Related residential areas found in association with extraction sites were also assigned to mining. In general, these sites are clustered within known historic mining districts, such as Meadow Lake and Lowell Ridge.

Water Conveyance and Storage—Thirty-two sites represent resources built specifically for the storage and/or conveyance of water. The majority of these are ditches, although a few crib or check dams were also identified. Most of the ditches are assumed to have originated in the nineteenth century for use during mining operations, though their exact age is often unknown. There are several ditches, however, that were built in the first quarter of the twentieth century for hydroelectric development. Ditches range from narrow, shallow, short earthen channels with few distinguishing elements, to deep, wide, prominent conveyance features with stacked rock sides, cut-and-fill sections, and other defining characteristics. The larger ditches, often depicted on historic maps, are sometimes labeled (i.e., Liberty Hill Ditch) and have clear mining-related origins; although most were reused for irrigation or hydroelectric development in the twentieth century. One ditch appears to have been constructed by Chinese laborers, based on the artifacts recorded at an associated site. Related features found with the ditches range from a small concrete weir or check dam to a massive log crib dam.

Hydroelectric Related—Hydroelectric-related historic sites dominate the historical resources observed within the APE. Thirty-nine sites were identified as being related to the building and maintenance of the Drum-Spaulding Project; these include 25 construction-related sites, 2 sites related to the maintenance of the system, and 12 residential sites. Construction sites include cement batch plants, quarries, railroads, crane foundations, and work areas occupied during the construction phase. Maintenance sites are sites that were used for many years solely for the maintenance of canals, powerhouses, dams, and other hydroelectric features. Twelve sites are related to the housing of employees who worked on the project features. These sites include small, discrete dam and ditch tender's residences often occupied on a year-round basis, or larger camps with multiple dwellings or bunkhouses used seasonally by crews repairing and maintaining the project. Many of the larger temporary construction camps were converted to permanent residential use once the building phase was complete, with occupancy continuing through the 1950s. If a site contained obvious activity areas related to the construction effort (blacksmithing areas, stables, cement plant), it was assigned a construction function, even if a residential component was also identified.

Ranching—Grazing cattle, sheep, and other livestock began in the high Sierra by the 1850s and continues today. Sites associated with ranching activities include corrals, residential areas used as base camps for cattle or sheep herding, and trash scatters affiliated with low elevation ranch houses. Six sites were attributed to ranching activities. In addition, several abandoned barns were discovered during the survey within the APE, sometimes in affiliation with a collapsed corral. These barns were standing, with roofs and interior features intact, and were recorded as architectural resources.

Logging—The cutting of timber has a long history in the Sierra, beginning with the gold rush and continuing today. Six sites found during the survey were assigned a logging function. These include several segments of the historic Towle Brothers Railroad, a Towle Brothers mill site, a railroad grade and logging camp associated with the Birce and Smart Company, an isolated steam donkey site, and refuse deposits that appear associated with a logging work camp operation.

Recreation—The Sierra Nevada has long been recognized for its recreational value. As such, many of the lakes within the APE contain recreational facilities including summer vacation homes; hunting lodges; organized camps for Girl Scouts, Boy Scouts, and religious groups; and established PG&E and Forest Service campgrounds. However, only one archeological site, remains of the Sierra Club Ski Hut at White Rock Lake, was definitely designed, built, and used exclusively for a recreational purpose. This hut was one of six built by the ski club in the 1920s and 1930s and was used seasonally for a number of years. It is likely that many of the sites assigned to the refuse deposits type, described below, represent casual discard of garbage by campers, hunters, fisherman, and others pursuing recreational activities of the project. Without definite contextual affiliations, however, the random can dumps and discrete trash scatters are assigned to a general refuse disposal activity and not specifically to recreational use function.

Settlement—Settlement sites were divided into two categories: town sites and house sites. Town sites were identified through archival research as sites that once contained a variety of residential and commercial buildings and/or structures. Three town sites were found during the project research: Summit City, Mendoza and Hudsonville, all located within the Meadow Lake Mining District. They represent early settlement history of the area, dating to the 1860s-1875. In addition to town sites, eight individual house sites were found. These sites typically contain a house pad or rock foundation and associated historic debris related primarily to domestic use. These sites may have been homesteads or have been used seasonally or for a short period of time.

Refuse Deposit—Twenty-five historical sites were classified as refuse deposits with no known association or historical context. Typically, these sites consist of discrete piles of metal cans, ranging from a dozen or so to hundreds of these containers. A minimal amount of glass (usually from alcohol or condiment bottles) or ceramics was observed in association with a few of the sites. The majority of refuse deposits represent late 1940s to early 1960s use of the project.

Other—Four sites have an unknown historical function and were assigned as “Other.” These include one site with an isolated concrete pad, isolated points along an abandoned transmission line, a ditch construction or mining camp, and a site with a cable anchor, structural pads, and a debris scatter.

Multicomponent Site Types

Ten multicomponent sites were identified within the Drum-Spaulding Project APE (table 3-232). In general, five of the sites are dominated by lithic debitage, but have a few cans or glass fragments on the surface, and the other five sites are dominated by historic material with a few lithic artifacts.

The five sites dominated by lithic debitage contain chronologically sensitive tools, obsidian flakes, and other artifacts. Two of the five predominately historic sites are mining-related sites (ca. 1865-1870) within the historic Meadow Lake Mining District and contain foundation pads, intact refuse deposits, and other features.

Table 3-232. Summary of multicomponent site types in the Drum-Spaulding Project APE.
(Source: PG&E, 2012b)

Multicomponent Site Type	Number of Sites	Percentage of Multicomponent Site Types
Primarily prehistoric with historic elements	5	50
Primarily historic with prehistoric lithics	5	50
Total	10	100

Yuba-Bear Project—NID identified 144 archeological resources (110 archeological sites and 34 isolated artifacts) in the Yuba-Bear Project APE. Of the 110 recorded archeological sites in the APE, 7 are multicomponent sites that contain cultural remains associated with both prehistoric and historic occupation and/or use, 9 sites contain only prehistoric artifacts or features, and the remaining 94 sites are representative of the historic period.

NID examined the National Register eligibility of 72 of the 110 archeological sites based on archival research and field observations (table 3-233). Of the 72 evaluated sites, all were determined to be ineligible for listing on the National Register. The 34 isolated artifacts do not provide enough data relevant to understanding past events; therefore, these resources were not considered for listing on the National Register.

Table 3-233. Summary of the 72 evaluated archeological sites and National Register status in the Yuba-Bear Project APE. (Source, NID, 2012)

National Register Status	Prehistoric Sites	Historic Sites	Multicomponent Sites	Total Number of Sites
Ineligible	0	70	2	72
Potentially Eligible	0	0	0	0
Eligible	0	0	0	0
Total	0	70	2	72

Of the remaining 38 prehistoric, historic, and multicomponent archeological sites 36 were not evaluated for the National Register, one was previously determined ineligible, and the other was not relocated. Table 3-234 summarizes the status of these sites. As will be discussed further in the environmental effects section, 14 of the 36 unevaluated sites are experiencing project-related effects, while the remaining 22 are presently not experiencing project-related effects.

Table 3-234. Summary of the 38 unevaluated archeological sites in the Yuba-Bear Project APE. (Source, NID, 2012)

Effects	Prehistoric Sites	Historic Sites	Multicomponent Sites	Number of Sites
Unevaluated Sites	9	22	5	36
Previously Recorded Site –Ineligible for the National Register	0	1	0	1
Previously Recorded Site – Unable to Relocate	0	1	0	1
Total	9	24	5	38

The two remaining sites considered ineligible and unable to be relocated include the Bowman Barracks camp (P-29-2028/CA-NEV-1324H) and a previously recorded historic-era habitation site (FS 05-17-55-325). The Bowman Barracks camp was previously evaluated as being ineligible for listing on the National Register; the SHPO concurred with this finding in a letter dated July 26, 2000. This site was not re-evaluated in the cultural resources inventory reports. Site FS 05-17-55-325, identified during the initial archival research, could not be relocated during the project relicensing field survey and, therefore, required no National Register consideration.

Prehistoric Site Types

Of the 110 archeological sites recorded in the APE during the project relicensing, 9 are exclusive to prehistoric use (table 3-235). Occupation sites were the most common site type encountered and contain a variety of flaked and ground stone tools. The two other prehistoric site types are lithic scatters and bedrock milling stations.

Table 3-235. Summary of prehistoric site types in the Yuba-Bear Project APE. (Source, NID, 2012)

Prehistoric Site Type	Number of Sites	Percentage of Prehistoric Site Types
Lithic Scatters	2	22.2
Bedrock Milling Stations	3	33.3
Occupation Sites	4	44.4
Total	9	99.9

The nine prehistoric sites in the Yuba-Bear APE were not evaluated for National Register eligibility. All nine sites are being treated as if they are eligible for listing on the National Register. One of the two lithic scatters, one of the three bedrock milling stations, and two of the four occupation sites are experiencing project-related effects and are scheduled to be evaluated for National Register eligibility within 5 years following license issuance.

Historic Site Types

Historic sites occurred throughout the APE, totaling 94 in number. These resources reflect land-use themes centering on transportation, mining, water conveyance and storage, hydroelectric related, settlement, refuse deposits, and other. The historic resources are summarized in table 3-236 and are described below.

Table 3-236. Summary of historic site types in the Yuba-Bear Project APE. (Source, NID, 2012)

Historic Site Type	Number of Sites	Percentage of Historic Site Types
Transportation	4	4.3
Mining	30	31.9
Water Conveyance and Storage	14	14.9
Hydroelectric Related	9	9.6
Settlement	13	13.8
Refuse Deposit	18	19.1
Other	6	6.4
Total	94	100.0

Transportation—Four sites were identified under the Transportation land-use theme. These include segments of the “Dutch Flat to Henness Pass Road,” the Nevada Narrow Gauge Railroad bridge remains with four concrete piers and a stone culvert, a concrete culvert/bridge on Chicago Park Forebay Road, and a segment of old Highway 40 that includes a concrete culvert date stamped “1924.”

Mining—The majority of the historic sites were identified as being related to mining activities. Mining sites were defined as sites related to the extraction and processing of minerals. Extraction sites include prospect pits, adits, shafts, sluice mining channels, hydraulic mining waste areas, and stacked rock tailings. The sites include mining ditches with rock retaining walls; a mining complex that included a tailings areas, two road traces, a pit, an earthen check dam, a railroad boxcar, a large earthen reservoir, a prospect pit, refuse scatter, and hydraulic scar; collapsed adits; prospect pits; tailing piles; and earthen dams.

Water Conveyance and Storage—Fourteen historic sites were identified as being related to water conveyance and storage. These sites include flumes, ditches, and check dams (concrete, aggregate, and earthen construction).

Hydroelectric Related—Nine historic sites were identified as hydroelectric related. These sites include a conduit diversion gate, diversion dam and penstock gate, a cobble-and-boulder berm, and a possible spillway or abandoned gate with associated debris. One site was identified by an earthen-filled pad bounded by concrete and stone retaining walls and suggested to be associated with the Fuller Lake to Spaulding powerhouse no. 3 built in 1928.

Settlement—Settlement sites were identified through archival research as sites that once contained a variety of residential and commercial buildings and/or structures. The thirteen settlement sites include house sites evidenced by the presence of foundations or footings or by extant structural

remains. One site, Munson Church Camp, is a complex that includes two houses, four associated structures, rock walls, a wagon, and a dock.

Refuse Deposit—Eighteen historical sites were classified as refuse deposits with no known association or historical context. Typically, these sites consist of discrete piles of metal cans, ranging from a dozen or so to hundreds of these containers. A minimal amount of glass (usually from alcohol or condiment bottles) or ceramics was observed in association with a few of the sites. The majority of refuse deposits represent late 1940s to early 1960s use of the project.

Other—Six sites have an unknown historical function and were assigned as “Other.” These include transmission line remains (poles, wire lines, insulators); three concrete piers and associated historic debris; a stone retaining wall; a partially submerged earthen boat ramp, six concrete slabs, and two concrete footings; the remnants of a possible footbridge and roadside refuse scatter; and four concrete footings that appear to be associated with an old utility line.

Multicomponent Site Types

Seven sites documented within the APE contain both prehistoric and historical cultural materials and are classified as multicomponent sites (table 3-237). In general, five of the sites are dominated by prehistoric elements but have a few historic elements on the surface. One of these sites includes rock art and two prehistoric house pits. Two sites are primarily historic with only a minimal number of prehistoric lithic artifacts (flakes) encountered.

Table 3-237. Summary of multicomponent site types in the Yuba-Bear Project APE. (Source, NID, 2012)

Multicomponent Site Type	Number of Sites	Percentage of Multicomponent Site Types
Primarily prehistoric with historic elements	5	71.4
Primarily historic with prehistoric lithics	2	28.6
Total	7	100.0

Historic Buildings and Structures

Drum-Spaulding Project—PG&E identified 118 built environment resources during surveys. The built environment resources in the Drum-Spaulding Project are summarized in table 3-238. The majority (90) of these resources are associated with the generation of electricity and include dams, powerhouses, canals, switchyards, work and residential camps, tramways, and other features related to the historic development of the project. The 90 resources associated with the generation of electricity include 73 resources identified as hydroelectric related and 17 resources identified as high-elevation dams. The remaining 28 built environment resources are non-hydroelectric resources. The non-hydroelectric resources are related to recreation, transportation, ranching, non-project water conveyance systems, and “other” (an historic grave plot).

PG&E documented the 2009 and 2010 built environment survey results in an Architectural Inventory and Evaluation Report submitted to agencies and the California SHPO for review on June 24, 2011, and requested concurrence that the Drum-Spaulding Hydroelectric District is eligible for the National Register, that 8 resources (Alta powerhouse, Deer Creek powerhouse, Deer Creek switchyard, old Bear River bridge, Deer Lake girl scout camp historic core, Dutch Flat coal house, Dutch Flat post

Table 3-238. Summary of the SHPO determination of National Register eligibility for the built environment resources in the Drum-Spaulding Project APE. (Source: PG&E, 2012b)

National Register Status	Hydroelectric Related	High Elevation Rock Face Dams	Non-Hydroelectric Related	Total
Ineligible	22	17	23	62
Eligible as Contributing Element	35	0	0	35
Eligible	3	0	5	8
Modern: not formally recorded	13	0	0	13
Total	73	17	28	118

office, and Dutch Flat monument) are individually eligible for the National Register, that 15 resources are eligible individually and as contributing elements to the Drum-Spaulding Hydroelectric District, that 19 resources are eligible only as contributing elements to the Drum-Spaulding Hydroelectric District, and that 68 resources are not eligible for listing on the National Register either individually or as contributing elements to a district: Alta powerhouse system elements (n=1), Deer Creek powerhouse system elements (n=6), Drum-Spaulding Hydroelectric Historic District elements (n=18), Dutch Flat hydroelectric system elements (n=1), high-elevation rock face dams (n=17), and non-hydroelectric built resources (n=17).²⁷

On February 13, 2012, the SHPO's review found that 7 of the built environment resources were eligible for the National Register (table 3-239). These include the Drum-Spaulding Hydroelectric District with 35 contributing resources, the Alta and Deer Creek powerhouses, and 4 non-hydroelectric-related resources: Deer Lake girl scout camp, Dutch Flat coal house, Dutch Flat post office, and Dutch Flat monument. The remainder of the resources were determined to be ineligible to the National Register.

In November 2011, PG&E submitted an Addendum Built Environment Report to the agencies and the California SHPO for review. On January 9, 2012, the SHPO concurred with the following relevant to the addendum report: (1) the revised APE is appropriate for the proposed undertaking; (2) the historic property identification efforts were adequate; and (3) the two newly recorded built environment resources (the Nevada diversion and Haines Road bridge) are not eligible for listing on the National Register, either individually, or as contributing elements to a district.

The project is divided into four hydroelectric systems that reflect different construction efforts and time periods. These include the Alta Powerhouse System, Deer Creek Powerhouse System, Dutch Flat Powerhouse System, and Drum-Spaulding Powerhouse System, which includes the Drum-Spaulding Hydroelectric Historic District.

The Alta, Deer Creek, and Dutch Flat Hydroelectric Systems are not eligible for the National Register; however, there are some elements within these systems that are individually eligible for

²⁷ Although PG&E identifies 68 resources as not being eligible for listing on the National Register, we only come up with a sum total of 60 resources (n=1 + n=6 + n=18 + n=1 + n=17 + n=17 = 60). This discrepancy should also be addressed in PG&E's revised HPMP. See discussion in the environmental effects section.

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
Alta Powerhouse System (APS)	P-31-1289 P-31-5391	Towle intake and canal, ca. 1866; modified 1921, 1959	Yes	Ineligible
APS	P-31-5390	Towle diversion dam, ca. 1866; modified 1921	Yes	Ineligible
APS	P-31-5392	Alta forebay dam, ca. 1864, modified 1902	Yes	Ineligible
APS	P-31-5393	Alta penstock, ca. 1902; modified 1955	Yes	Ineligible
APS	P-31-4403	Alta powerhouse, ca. 1902	Yes	Eligible
Deer Creek Powerhouse System (DCPS)	P-29-0879	Main South Yuba canal, ca. 1858; modified 1878, 1926-1999	No	Ineligible (2004)
DCPS	P-29-4251	Bear Valley work camp, ca. 1913	Yes	Ineligible
DCPS	P-29-4253	Chalk Bluff canal, ca. 1858; modified 1878, 1993	Yes	Ineligible
DCPS	P-29-4304	Big tunnel, ca. 1893; modified 1908	Yes	Ineligible
DCPS	P-29-4254	Deer Creek forebay/dam, ca. 1907	Yes	Ineligible
DCPS	P-29-4252	Deer Creek penstock/intake, ca. 1908	Yes	Ineligible
DCPS	P-29-4255	Deer Creek powerhouse 1, ca. 1908	Yes	Eligible
Drum-Spaulding Hydroelectric Historic District (DSHHD)	P-29-4257	Fordyce dam, ca. 1873; modified 1881, 1911, 1923-1926, 1931, 1935, 1979, 1996	Yes	Eligible
DSHHD	P-29-4258	Fordyce Dam Access Road, ca. 1923	Yes	Eligible
DSHHD	P-29-4046	Fordyce dam tender's house, ca. 1953	Yes	Ineligible

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
DSHHD	P-31-5394	Lake Valley dam/Lake Valley auxiliary dam, ca. 1889, 1911; modified 1928	Yes	Eligible
DSHHD	P-31-5395	Kelly Lake dam, ca. 1887, modified 1928	Yes	Eligible
DSHHD	P-31-5396	Lake Valley canal diversion dam, ca. 1928; modified 1937, 1941, 1946, 1979	Yes	Eligible
DSHHD	P-31-5396	Lake Valley (Crossover) canal, ca. 1928; modified 1937, 1941, 1946, 1979	Yes	Eligible
DSHHD	P-29-4259	Spaulding 1 dam, ca. 1913-1919; modified 1939, 1977	Yes	Eligible
DSHHD	P-29-4261	Spaulding 2 dam, ca. 1916; modified 1919, 1974	Yes	Eligible
DSHHD	P-29-4260	Spaulding 3 dam , ca. 1913-1919	Yes	Eligible
DSHHD	P-29-4263	Spaulding 1 powerhouse, ca. 1917; modified 1928	Yes	Eligible
DSHHD	P-29-4263	Spaulding 2,powerhouse, ca. 1920; modified 1928, 1933	Yes	Eligible
DSHHD	P-29-4265	Spaulding 2 penstock, ca. 1920	Yes	Eligible
DSHHD	P-29-4265	Spaulding 3 powerhouse, ca. 1928	Yes	Eligible
DSHHD	P-29-4266	Spaulding 3 penstock, ca. 1928	Yes	Eligible
DSHHD	P-29-4267	Spaulding incline railway/tram, ca. 1917; modified 1924, 1933, 1952	Yes	Eligible
DSHHD	P-29-4267	Spaulding snowsheds/stairs, ca. 1917; modified 1924, 1933, 1952	Yes	Eligible
DSHHD	P-29-4268	Spaulding Dam Access Road, ca. 1912	Yes	Eligible

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
DSHHD	P-29-4269	Spaulding dam maintenance camp, ca. 1913-1928	Yes	Eligible
DSHHD	P-29-4270	Camp Spaulding (residential), ca. 1912-1927; modified 1970s	Yes	Eligible
DSHHD	P-29-4271	Spaulding dam tender's house, ca. 1915; modified 1953	Yes	Ineligible
DSHHD	P-29-4272	Drum canal, ca. 1912; modified 1917, 1928, 1965	Yes	Ineligible
DSHHD	P-29-4300	Nevada diversion spillway, ca. 1912; modified 1917, 1928, 1965	Yes	Ineligible
DSHHD	P-31-5405	Drum forebay dam, ca. 1913; modified 1965	Yes	Ineligible
DSHHD	P-31-5406	Drum 1 and 2 penstock and valve and wheel houses, ca. 1913 (#1) and 1922 (#2)	Yes	Eligible
DSHHD	None	Drum penstock 3, ca. 1965	No	Modern: not formally recorded
DSHHD	P-31-4387	Drum 1 powerhouse, ca. 1913	Yes	Eligible
DSHHD	None	Drum 2 powerhouse, ca. 1965	No	Modern: not formally recorded
DSHHD	P-31-5403	Drum residential camp, ca. 1959; modified 1997	Yes	Ineligible
DSHHD	P-31-5403	Drum water tower, ca. 1913	Yes	Eligible
DSHHD	None	Drum Access Road, ca. 1925	No	Modern: not formally recorded
DSHHD	P-31-5401	Halsey forebay 1 and 2 dams, ca. 1916; modified 1923, 1955, 1975, 1999	Yes	Eligible (1999)

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
DSHHD	P-31-1745	Bear River canal, ca. 1852; modified 1913, 1931	Yes	Eligible
DSHHD	P-31-1745	Bear River diversion dam, ca. 1909; modified 1926, 1931, 1974	Yes	Eligible
DSHHD	P-31-5397	Halsey penstock, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-4955	Halsey powerhouse compound, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-5398	Halsey afterbay dam, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-1816	Rock Creek multi-arch dam, ca. 1916; modified 1966, 1998	Yes	Ineligible
DSHHD	None	Rock Creek intake, ca. 1916; modified 1960s	No	Modern: not formally recorded
DSHHD	P-31-5399	Wise forebay dam, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-5400	Wise penstocks, ca. 1916	Yes	Ineligible
DSHHD	P-31-1109	Upper Wise canal, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-1109	Lower Wise canal, ca. 1913-1916	Yes	Eligible
DSHHD	P-31-4502	Wise 1 powerhouse compound, ca. 1917	Yes	Eligible
DSHHD	None	Wise 2 powerhouse, ca. 1986	No	Modern: not formally recorded
DSHHD	P-31-3050	South canal, ca. 1917; modified 1920, 1931	Yes	Eligible
DSHHD	P-31-3050	Halborn concrete flume, ca. 1931	Yes	Eligible
DSHHD	P-31-3050	Appleton concrete flume, ca. 1931	Yes	Eligible

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
DSHHD	None	Newcastle powerhouse intake/penstock, ca. 1986	No	Modern: not formally recorded
DSHHD	None	Newcastle powerhouse, ca. 1986	No	Modern: not formally recorded
DSHHD	None	Switchyards, ca. 1913-1986; modified many times	No	Modern: not formally recorded
DSHHD	None	Weirs, gauges, gauge houses, spill gates, ca. 1913-1928; modified many times	No	Modern: not formally recorded
DSHHD	None	Microwave transmitters, ca. 1950-2000	No	Modern: not formally recorded
DSHHD	P-31-4305	Deer Creek-Drum 60kV transmission line, ca. 1916; modified many times	Yes	Ineligible
DSHHD	P-31-5462	Auburn Ravine improvements, ca. 1913; modified many times	Yes	Ineligible
DSHHD	None	Jordan Creek diversion, ca. 1960s	No	Modern: not formally recorded
Dutch Flat Powerhouse System (DFPS)	None	Drum afterbay, ca. 1928; reconstructed 1967	No	Modern: not formally recorded
DFPS	None	Dutch Flat 1 intake, ca. 1943; reconstructed 1967	No	Modern: not formally recorded
DFPS	P-31-5387	Dutch Flat 2 penstocks, ca. 1943	Yes	Ineligible
DFPS	P-31-5389	Dutch Flat tunnel, ca. 1943	Yes	Ineligible

Table 3-239. Drum-Spaulding Project built environment resources (hydroelectric related) and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
DFPS	P-31-5388	Dutch Flat 1 powerhouse, ca. 1943	Yes	Ineligible

inclusion in the National Register. A description of the National Register eligibility components within these three hydroelectric systems within the Drum-Spaulding Project follows.

The Alta Powerhouse System, as a whole, has greatly diminished integrity and does not appear to qualify for inclusion on the National Register. However, the Alta powerhouse retains its eligibility status at the local level under criterion A for its representation of pioneering hydroelectric development in the Sierra Nevada of California, as initially determined by the California SHPO in 2007.

In the Deer Creek Powerhouse System, modifications to the two major features (the South Yuba and Chalk Bluff canals) have compromised the integrity of the district; therefore, this system does not qualify for inclusion on the National Register. Individually, the South Yuba canal was previously determined ineligible for inclusion in the National Register (Baker et al., 2004) with California SHPO concurrence. However, the Deer Creek powerhouse, while not of outstanding architectural or engineering design, appears to meet criterion A as an example of early PG&E hydroelectric development efforts, and it is individually eligible at a state level with a period of significance of 1908, its date of construction.

The Dutch Flat Powerhouse System (built in 1942) does not reflect an outstanding engineering design and does not appear to meet National Register criteria. In addition, no elements are individually eligible for the National Register.

The Drum-Spaulding Powerhouse System was designed by Frank Baum and James Wise with architect Ivan Frickstad, and was instrumental in the development of long-distance transmission, representing a major construction effort. Thus, it is eligible for the National Register under criteria A and C at the state level, with a period of significance dating from 1912 to 1931. There are 35 contributing built environment resources located within the Drum-Spaulding Powerhouse System that are identified as the Drum-Spaulding Hydroelectric Historic District.

The Drum-Spaulding Hydroelectric Historic District is an intact example of a high-head, impulse-wheel, high-voltage electric generation system, as well as criterion C, as an example of cutting-edge construction technology in the hydroelectric field during its period of significance. Individually eligible components of the district include the main Spaulding dam; Drum, Halsey, and Wise powerhouses; Spaulding no. 1 powerhouse; the incline railway, snowsheds, and stairs that access Spaulding no. 1 powerhouse; the Spaulding dam maintenance camp and Camp Spaulding; Drum nos. 1 and 2 penstocks with associated valve and wheel houses, the Halsey afterbay dam, and the South canal with its two associated concrete flumes. Although the Rock Creek multi-arch dam was determined eligible for inclusion on the National Register in 1999 with California SHPO concurrence, the dam was mitigated through Historic American Engineering Record documentation, subsequently modified by PG&E, and is no longer individually eligible for inclusion on the National Register or as a contributing element to the district.

In addition, the Drum-Spaulding Hydroelectric Project includes 17 small reservoirs used to store water for release into Fordyce and Spaulding Lakes (table 3-240). In general, these lakes are contained behind small, rock-faced dams that have their origins in the gold rush quest for water necessary for mining. These dams have been raised, rebuilt, and modified many times through the years, particularly during conversion to hydroelectric use and do not retain integrity reflective of gold-rush roots. They are modest dams that have no outstanding characteristics that make them unique. While they store water for the overall system, they are not outstanding engineering components and no longer retain their early historical importance to the California Gold Rush era. As such, these dams do not meet any of the National Register criteria and are evaluated as not eligible for inclusion in the National Register.

Of the identified built environment resources (table 3-241), 28 were not associated with the hydroelectric development, and most have no historical or architectural/engineering importance or have

Table 3-240. High-elevation dams identified within the Drum-Spaulding Project APE and National Register eligibility. (Source: PG&E, 2012b)

Project Location	Resource No.^a	Land Owner^b	Site Type^c	Description	National Register Evaluation	National Register Eligibility Assessment
Spaulding 1 and 2	P-29-4111	PG&E	Dam	White Rock dam, ca. 1855 modified 1922,1931	Yes	Ineligible
Spaulding 1 and 2	P-29-4110	PG&E	Dam	Meadow Lake dam, ca. 1864, modified 1921, 1931, 1963, 1966, 1986	Yes	Ineligible
Spaulding 1 and 2	P-29-4122	PG&E	Dam	Sterling Lake dam, ca. 1858, modified 1922, 1929, 1979	Yes	Ineligible
Spaulding 1 and 2	P-29-4349	PG&E	Dam	Upper Peak Lake dam, ca. 1850, modified 1931, 1954, 1964	Yes	Ineligible
Spaulding 1 and 2	P-29-4350	PG&E	Dam	Lower Peak Lake dam, ca. 1860, modified 1923, 1932	Yes	Ineligible
Spaulding 1 and 2	P-29-4348	PG&E	Dam	Kidd Lake dam, ca. 1855, modified 1922, 1931, 1945, 1962, 1972	Yes	Ineligible
Spaulding 3	P-29-4121	PG&E	Dam	Upper Rock Lake dam, built 1855, modified 1931	Yes	Ineligible
Spaulding 3	P-29-4120	PG&E	Dam	Lower Rock Lake dam, ca. 1921, modified 1931	Yes	Ineligible
Spaulding 3	P-29-4119	PG&E	Dam	Culbertson Lake dam, ca. 1852, modified 1921, 1931	Yes	Ineligible
Spaulding 3	P-29-4115	PG&E	Dam	Upper Lindsey Lake dam, ca. 1870, modified 1931	Yes	Ineligible
Spaulding 3	P-29-4061	PG&E	Dam	Middle Lindsey Lake dam, ca. 1920, modified 1931	Yes	Ineligible

Table 3-240. High-elevation dams identified within the Drum-Spaulding Project APE and National Register eligibility. (Source: PG&E, 2012b)

Project Location	Resource No.^a	Land Owner^b	Site Type^c	Description	National Register Evaluation	National Register Eligibility Assessment
Spaulding 3	P-29-4118	PG&E	Dam	Lower Lindsey Lake dam, ca. 1921, modified 1932,1972	Yes	Ineligible
Spaulding 3	P-29-4116	PG&E	Dam	Carr Lake dam, ca. 1870, modified 1921, 1931, 1972	Yes	Ineligible
Spaulding 3	P-29-4117	PG&E	Dam	Feeley Lake dam, 1870, modified 1921, 1931, 1972	Yes	Ineligible
Spaulding 3	P-29-4112	PG&E	Dam	Blue Lake dam, ca. 1856, modified 1931, 1990	Yes	Ineligible
Spaulding 3	P-29-4113	PG&E	Dam	Rucker Lake dam, ca. 1856, modified 1922, 1930, 1964, 1966, 1976, 1987	Yes	Ineligible
Spaulding 3	P-29-4114	PG&E	Dam	Fuller Lake dam, ca. 1856, modified 1922, 1930, 1964, 1966, 1976, 1987	Yes	Ineligible

Table 3-241. Non-hydroelectric historic buildings and structures identified within the Drum-Spaulding APE and National Register eligibility. (Source: PG&E, 2012b)

Project Location	Resource No.^a	Land Owner^b	Site Type^c	Description	National Register Evaluation	National Register Eligibility Assessment
Sterling Lake	05-15-53-943 STR-MRM-A1	PG&E TNF	Trail	Sterling Lake trail, ca. 1957	Yes	Ineligible
Upper Rock Lake	P-29-4058 RKU-MRM-A1	PG&E	Trail	Rock Lake trail, ca. 1860s	Yes	Potentially Eligible
Fuller Lake	05-17-53-950 FUL-MRM-A4	PG&E TNF PVT	Road	Bowman Road (abandoned), ca. 1856	Yes	Ineligible
Spaulding Lake	SPL-MRM-A26	PG&E	Trail	Spaulding Lake trail, ca. 1891	Yes	Ineligible
Bear River Canal	BRC-MRM-A10	PVT	Retaining wall	Dog Bar Road rock retaining wall, ca. 1920s	Yes	Ineligible
Drum Canal Access Roads	DMCR-MRM-A1	PG&E	Roll-up metal bridge	Bear Creek bridge, ca. 1950s	Yes	Ineligible
Bear River Canal	BRC-MRM-A1 CA-NEV-1828-H CA-PLA-2240-H	PVT	Concrete arch bridge	Old Bear River bridge, ca. 1924	Yes	Eligible
Bear River Canal	BRCS-MRM-A9	PVT	Concrete bridge	Campground Road bridge, ca. 1930	Yes	Ineligible
Wise Development	P-31-5423	PVT	Concrete bridge	Haines Road bridge, ca. 1930s	Yes	Ineligible

Table 3-241. Non-hydroelectric historic buildings and structures identified within the Drum-Spaulding APE and National Register eligibility. (Source: PG&E, 2012b)

Project Location	Resource No.^a	Land Owner^b	Site Type^c	Description	National Register Evaluation	National Register Eligibility Assessment
Sterling Lake	P-29-262-H CA-NEV-1662 05-1753-865	PG&E TNF	Organization al camp	Robert L. Cole Boy Scout Camp, ca. 1954	Yes	Ineligible
Kidd Lake	KID-MLM-A1	PG&E PVT	Organization al camp	Deer Lake Girl Scout Camp Historic Core, ca. 1928-1930, 1970	Yes	Eligible
Peak Lakes	PKU-MLM-A1	PG&E PVT	Organization al camp	Camp Winthers, ca. 1957	Yes	Ineligible
Culbertson Lake	CUL-MLM-A2	PG&E PVT	Vacation home	Culbertson Lake Vacation Home Complex, ca. 1920s, 2009	Yes	Ineligible
Fuller Lake	FUI-MLM-A1	PG&E PVT	Recreational club	Grass Valley Rod and Gun Club, ca. 1942-1955	Yes	Ineligible
Fuller Lake	FUL-MRM-A2	PVT	Recreational club	Dear Fly Lodge, ca. 1930s	Yes	Ineligible
Bear River Canal	BRC-MRM-A12	PVT	Barn	Bear Valley barn (Meadow Vista barn), ca. 1900	Yes	Potentially Eligible
South Yuba Canal	P-29-2249-H	PG&E	Corral	Bear Valley corral, ca. 1905-1990s	Yes	Ineligible
Bear River Canal	BRCR-MRM-A16	PVT	Shed	Shed, ca. 1940-1950s	Yes	Ineligible
Newcastle Powerhouse	NCP-MRM-A1	PVT	Ranch	Residence with barns/corral, ca. 1940s	Yes	Ineligible
Bear River Canal	BRC-MRM-A14	PVT	Non-project canal	Bowman feeder canal, ca. 1910s	Yes	Ineligible
Bear River Canal	P-31-796 CA-PLA-670	PVT	Non-project canal	Lower Boardman canal, ca. 1880, 1924	Yes	Ineligible

Table 3-241. Non-hydroelectric historic buildings and structures identified within the Drum-Spaulding APE and National Register eligibility.
(Source: PG&E, 2012b)

Project Location	Resource No.^a	Land Owner^b	Site Type^c	Description	National Register Evaluation	National Register Eligibility Assessment
Halsey Development	HSF-MRM-A11	PG&E PVT	Non-project canal	Bowman canal, ca. 1916	Yes	Ineligible
Wise Development	P-31-1110 CA-PLA-952H	PG&E PVT	Non-project canal	Fiddler's Green canal, ca. 1880, 1920, 1970	Yes	Ineligible
Dutch Flat Powerhouse Road	P-31-5348 DFPR-CB4	PVT	Coal house	Dutch Flat coal house, ca. 1920	Yes	Eligible
Dutch Flat Powerhouse Road	P-31-5351 DFPR-CB-3	PVT	House	Diggins Hill Road residence (Hegge House), ca. 1930	Yes	Ineligible
Dutch Flat Powerhouse Road	P-31-5349 DFPR-CB-1	PVT	Monument	Dutch Flat Historic Monument, ca. 1950	Yes	Eligible
Dutch Flat Powerhouse Road	P-31-5350 DFPR-CB-2	PVT	Post Office	Dutch Flat Post Office, ca. 1890-1898	Yes	Eligible
South Yuba Canal	P-29-4100 SYCR-MRM-05	PG&E	2 grave plot	Porter's grave, ca. 1880	Yes	Ineligible National Register Eligible California Environmental Quality Act

been significantly altered and do not meet National Register eligibility criteria due to their compromised integrity. Four of the resources (Deer Lake girl scout camp, Dutch Flat coal house, Dutch Flat post office, and Dutch Flat monument) meet National Register eligibility criteria and retain adequate integrity. One (Porter family grave plot) qualifies for the California Register of Historical Resources, but is not considered eligible for inclusion in the National Register. Three (Rock Lake trail, Old Bear River bridge, and Bear Valley barn) require further research to assess importance.

Yuba-Bear Hydroelectric Project—NID’s study of the Yuba-Bear Project’s built environment included documentation and National Register evaluation of the project system (e.g., powerhouses, dams, switchyards, and conduits). Twenty-four primary project features and numerous system sub-features were documented (table 3-242). The evaluation identified the system as ineligible for listing on the National Register as a historic district because the features of the system, as a whole, do not convey a unified sense of time and place, nor do they convey architectural interconnectedness. However, two buildings within the project, the Bowman House and the French Lake control house, were evaluated as individually eligible for listing on the National Register. The Bowman House appears eligible for listing on the National Register under criterion C on a local level, with a period of significance of 1935 as a distinctive Depression-era dam tender’s house associated with the early development of the NID (2012). The French Lake control house was evaluated as significant under criterion A for its association with the development of Nevada County’s hydraulic mining industry, as well as under criterion C as a representative example of 1850s high-mountain architecture on a local level, with a period of significance from 1858, the date of original construction (NID, 2012). The remaining system features, were evaluated individually as ineligible for listing on the National Register, though 13 of these system features are modern and will need to be documented and reevaluated when they reach 50 years of age.

Table 3-242. Summary of the built environment resources and National Register status in the Yuba-Bear Project APE. (Source: NID, 2012)

Eligibility Status	Total
Modern, Not Eligible	13
Insufficient Integrity, Not Eligible	9
Eligible	2
Total	24

Table 3-243 lists the system features and construction history. Only those features and facilities identified during archival research and field studies as being 50 years old or older were recorded in the field. All historic system features were recorded on CDPR 523 forms to current professional standards. When modern components of the project system that were not yet 50 years of age at the time of the relicensing studies reach 50 years of age, the licensee would evaluate those components for potential inclusion in the National Register.

NID has consulted with affected tribes, appropriate federal agencies, and the SHPO on eligibility determinations. The National Register evaluation of the project system and individual features was submitted to the SHPO for review and comment in a transmittal dated August 19, 2010. The SHPO concurred with these findings in a letter dated November 16, 2010.

Table 3-243. Yuba-Bear Project built environment resources and National Register eligibility. (Source: NID, 2012)

Project Location^a	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
Bowman Development		Jackson Meadows dam, ca. 1865	No	Modern
Bowman Development		Milton dams (1926, 1964, 1992)	Yes	Ineligible
Bowman Development		French Lake dam (1858, 1929, 1933, 1945, 1948)	Yes	Ineligible
Bowman Development		Sawmill dam (1910, enlarged 1930, 1938)	Yes	Ineligible
Bowman Development		Faucherie dam (1966)	No	Modern
Bowman Development		Jackson Lake dam (1926, 1942, 1945, 1948)	Yes	Ineligible
Bowman Development		Bowman dams (1926, modified 1960s, 1980s)	Yes	Ineligible
Bowman Development		Bowman Road (1925)	Yes	Ineligible
Bowman Development		Bowman powerhouse (1980s)	No	Modern
Bowman Development		Milton-Bowman diversion tunnel/ conduit (1926, enlarged 1964)	Yes	Ineligible
Bowman Development		Bowman house (1935)	Yes	Eligible
Bowman Development		French Lake control house (1935)	Yes	Eligible
Bowman Development		Bowman-Spaulding transmission line (1980s)	No	Modern
Dutch Flat Development		Texas Creek diversion dam (1960s)	No	Modern
Dutch Flat Development		Fall Creek diversion dam (1920s, 1960s)	Yes	Ineligible
Dutch Flat Development		Dutch Flat forebay dam (1966)	No	Modern

Table 3-243. Yuba-Bear Project built environment resources and National Register eligibility. (Source: NID, 2012)

Project Location^a	Primary Number	Description	National Register Evaluation	National Register Eligibility Assessment
Dutch Flat Development		Bowman-Spaulding conduit (1926, rebuilt 1964)	Yes	Ineligible
Chicago Park Development		Dutch Flat afterbay dam (1966)	No	Modern
Chicago Park Development		Chicago Park powerhouse (1966)	No	Modern
Chicago Park Development		Chicago Park conduit (1966)	No	Modern
Rollins Development		Rollins dam (1966)	No	Modern
Rollins Development		Rollins powerhouse and transmission lines (1980)	No	Modern

Traditional Cultural Properties Study

Drum-Spaulding Project—In late 2010, one National Register-eligible TCP was identified in the Drum-Spaulding Project APE. This historic property has been used as a ceremonial and social event center, as well as a place for dances, since at least the late 1800s and probably well before. It has been a symbol and center of religious, social, and community life for people with Southern Maidu heritage; the area has been continuously used for the same or similar purposes for more than 100 years.

The ongoing and annual community ceremonies; the continued gathering of plants for food, medicines, and implements; the teaching of youth about the place; the use of native language to describe and lay down prayers for the place and the activities; along with the community's security and well-being in knowing that the place is protected are all associated with significant Maidu cultural history and perpetuation.

This TCP was evaluated as eligible for the National Register under criterion A at the local level of significance for its association with important events in the history and ongoing culture of the Southern Maidu. It is also evaluated as eligible for the National Register under criterion B at the regional level of significance for its association with this important teacher whose contributions to the ethnographic knowledge of California are extraordinary.

Under criterion A, this is a place of ongoing long-term cultural activity for the period of significance that began in the late-nineteenth-century ethnographic period and continues to the present. Under criterion B, the period of significance is ca. 1878-1968.

Yuba-Bear Project—The TCP study for the Yuba-Bear Project APE found that there was no specific information about ongoing traditional uses of places that might qualify them as

National Register-eligible TCPs. Native American participants knew that some people from their family or tribe lived in or near the APE, but could not identify where the places were specifically. Several people interviewed were aware of the medicinal, fungal, and food plants at the reservoirs, along the canals, and along the creek, but none of the plants has community value nor were any being adversely affected by the project.

3.3.6.2 Environmental Effects

3.3.6.2.1 Project-Related Effects on Cultural Resources

Project-related adverse effects on cultural resources considered eligible for the National Register (i.e., historic properties) would require PG&E to resolve such effects, in consultation with the SHPO and other parties, depending on the nature and location of the affected historic property. Project-related effects are brought about by activities that may alter characteristics of a historic property that contribute to its National Register eligibility; for example, road maintenance that affects a previously undisturbed archeological site or a facility improvement that removes windows or doors of an historic powerhouse. In addition, some project-related activities may not have a direct effect on historic properties, but may create conditions by which damage occurs. For example, building or maintaining a project road may not directly affect historic properties, but may enable public access to areas that contain these resources.

Project-related effects on cultural resources within the project's APE are likely to occur from routine O&M of buildings and structures; reservoir inundation and fluctuation; vegetation management; road maintenance, construction, and use; recreation; and emergency repairs. The following sections describe in more detail some of the activities within the project APE that may affect historic properties.

Routine Operation and Maintenance of Buildings and Structures

The project's hydroelectric operating system includes dams, powerhouses, penstocks, valve houses, canals, and associated features. As these facilities age, they require maintenance to continue operational efficiency. However, maintenance can affect the character-defining features that contribute to the significance of a building or structure. Future projects might include structural, mechanical, or electrical upgrades of facilities; maintenance or repair of buildings and other structures; replacement of windows, doors, roofing, or other building components; expansion or improvement of parking and storage areas; and other similar activities. In addition, ground-disturbing activities during construction of new proposed facilities could have the potential to directly or indirectly affect archeological sites.

Reservoir Inundation and Fluctuation

Historic properties, in particular archeological sites, within a reservoir basin may be consistently inundated by water or periodically subjected to wet-and-dry cycles and wave action associated with annual fluctuations in reservoir water level. The effects of these actions on sites may include erosion, deflation, hydrologic sorting, or displacement of artifacts. The severity of these effects is primarily dependent on where within the reservoir basin a site is located. Inundated sites may be affected less than sites within the annual fluctuation zone. Further, sites located on a reservoir shoreline can be subject to vandalism when they are exposed during the drawdown or low elevation periods.

Vegetation Management

Routine management of vegetation within the project is necessary at PG&E's facilities within the APE and to maintain safe distance between conductors and poles and the adjacent vegetation. Hazard trees may need to be trimmed or cut down to comply with the California Public Resources Code 4293; however, felling timber, skidding downed trees, and using harvesting equipment have the potential to affect historic properties.

Road Maintenance, Construction, and Use

Road maintenance and construction activities have the potential to affect historic properties in the project APE. Grading roads, excavating ditches for drainage, and replacing ineffective culverts pose potential threats to historic properties that are in the immediate vicinity of these activities. Vehicular traffic on dirt roadways can also damage historic properties.

Recreation

Recreational activities common in the project include boating, fishing, hiking, horse riding, off-roading (use of OHVs outside of designated roads and trails), and camping. These activities can expose historic properties and can lead to disturbance of intact cultural deposits, increased erosion or deterioration of sites, unauthorized artifact collection, or more severe vandalism and looting. The more accessible historic properties are to public traffic, the more likely they are to be affected by recreational activities. Ongoing maintenance at recreational facilities, formal and informal improvements, and infrastructure development can also affect significant cultural values. The addition of new recreational facilities would increase and exacerbate potential effects related to inadvertent destruction of archeological sites, unauthorized collection of artifacts, and vandalism.

Emergency Repairs

Emergency repairs to project facilities may be necessary in response to serious threats to life, property, or the safe operation of PG&E's hydroelectric facilities. Such actions, however, have the potential to affect historic properties. For example, an historic dam may require repair not in keeping with its original materials, or the creation of a fire break could affect a lithic scatter. In addition, emergency situations associated with non-project facilities could affect cultural resources within the project APE. For example, crews responding to downed non-project power lines may not be aware of the potential for affecting cultural resources within the project APE.

3.3.6.2.2 Drum-Spaulling Project Archeological Resources

PG&E documented 218 archeological sites in the project APE. Table 3-244 presents a summary of the National Register evaluation and a determination of project effects for these sites.

Table 3-244. Drum-Spaulding Project archeological site evaluation summary. (Source, PG&E, 2012b)

National Register Eligibility	Number of Sites	Project Effect	Number of Sites
Ineligible	103	Not applicable	103
Unevaluated	96	No effects	53
		Effects – Will be evaluated	33
		Effects – Will not be evaluated	10
Eligible	19	Effects	8
		To be determined	1
		No effects	10
Total	218		218

Ineligible Sites

PG&E identified 103 archeological sites as being ineligible for the National Register. Pending SHPO concurrence, review by the Forest Service, BLM, and Reclamation for resources on lands managed by each agency, and review by participating tribes, no further cultural resources management consideration is required for these sites. However, PG&E states in the HPMP that “[t]hough these sites have been determined ineligible, PG&E will undertake minor test excavations to ensure that there are no remaining subsurface archeological deposits that would prompt the reconsideration of the previous determination.”

Unevaluated Sites

Of the 96 sites unevaluated for National Register eligibility, PG&E determined that 53 are not being affected by any project-related activities. PG&E states in the HPMP that these 53 sites would be treated as if eligible for the National Register, avoided by O&M activities, and routinely monitored. Monitoring would follow the protocols described in section 4.3.5 of the HPMP. Regular monitoring would provide feedback concerning the condition of historic properties, confirming that sites have been avoided as planned, or signaling when additional management measures may be called for. PG&E proposes to initiate site monitoring within 1 year of final approval of the HPMP and would continue monitoring for the duration of the license. Monitoring may occur at 3-year, 1-year, or monthly intervals. Monthly monitoring would occur from May to October, weather conditions permitting. PG&E provided the monitoring schedule for sites identified in the APE in appendix I of the HPMP. Site Condition Assessment (SCA) forms would be used to document specific disturbances, impacts, or other physical alterations observed at each site. Sites would also be photo-documented, as necessary and appropriate. A non-invasive marker (e.g., a prominent tree) may be used as an annual photographic reference point (photo station) to record an ongoing effect. The locations of photo stations, the compass bearing used to take any photographs, and the subject matter being photographed would be noted on the SCA forms. PG&E would prepare an annual report summarizing the results of all monitoring activities during the preceding calendar year by March 1 of each year. The report would include written descriptions of disturbances observed at each monitored site. Appendices to the monitoring report would include the SCA forms, a photo station table, photo log, site summary table, and a table detailing disturbances identified during

previous years of monitoring (up to 5 years). The monitoring report would be submitted to consulting tribes and agencies at least 2 weeks prior to the annual consultation meeting. Based on the results of monitoring presented in the report, PG&E, tribes, and agencies would discuss at this meeting any proposals to increase or decrease monitoring frequency in response to recent site conditions. Any agreed upon changes in site monitoring frequency would be appended to the beginning of the monitoring plan, and submitted to tribes and agencies (as appropriate) as an errata sheet.

The remaining 43 unevaluated sites are experiencing project-related effects within the APE. Project-related effects identified at these sites include recreational activities, access road maintenance and use, PG&E construction staging areas, pot-hunting and metal detecting, dam outlet runoff, flooding, transmission line maintenance and vegetation clearing, fluctuating water levels, wave action, deflation, and slope erosion. PG&E proposes to conduct formal National Register evaluations at 33 of the 43 unevaluated sites. The proposed further investigations at the 33 sites is presented in an Historic Properties Evaluation and Treatment Plan (HPETP) that was prepared in consultation with FERC, the Forest Service, BLM, Reclamation, and tribes and was submitted by PG&E to the SHPO for review and concurrence (HPMP appendix H). The HPETP would guide PG&E in implementing treatment options designed to address ongoing and future effects on historic properties that may be a result of the project's O&M. The HPETP outlines standardized procedures for conducting archeological investigations at prehistoric, historic, and multicomponent sites. Methodologies are defined for conducting fieldwork, analysis, reporting, and curation. For historic sites, the HPETP includes archival research methodology.

PG&E proposes to conduct the National Register evaluation of the 33 unevaluated archeological sites within 5 years of approval of the HPMP, unless routine monitoring indicates that a modified schedule is required to address project-related effects promptly. Based on the outcome of the formal National Register evaluations, these sites would be managed following the general management measures discussed in section 4.3 of the HPMP and in the HPETP.

For the remaining 10 unevaluated sites within the APE that are subject to project-related effects, PG&E proposes to eliminate all project-related effects in the eight sites located on PG&E land; PG&E cannot eliminate the effects on the other two sites because they are located on private land. Project-related effects on sites situated on PG&E land include: construction staging areas, camping and recreational use including vehicle parking, vegetation clearing for transmission line maintenance, and wave action. PG&E proposes to eliminate vehicle parking at one site; post "No Dumping" signs at another site; reroute a trail that crosses through a site or, if the trail cannot be rerouted, then conduct test excavations and a formal evaluation of the site; avoid ground-disturbing vegetation removal in and adjacent to a site; monitor ongoing changes due to wave action and camping at two sites; and divert recreational use away from another site. The two unevaluated sites are located on private property and have disturbance from access roads. PG&E cannot eliminate effects at these sites because they are located on private property, and PG&E cannot get access to these lands.

Eligible Sites

PG&E recommended 19 archeological sites (including the Spaulding Dam Construction Discontiguous Archeological District) within the APE as being eligible for the National Register. PG&E determined that 8 of the 19 National Register-eligible sites are experiencing project-related effects. Effects at these sites include recreational activities; road construction, maintenance, and use; PG&E construction staging areas; modern trash disposal; pot-hunting; wave action; and deflation.

As stipulated in section 4.3.4 of the HPMP, PG&E proposes to resolve adverse effects at these 8 sites within 3 years of a determination of adverse effect to a historic property. Pending implementation of the resolution measures for these sites or a determination of effect, PG&E would monitor these sites, as outlined in section 4.3.5 of the HPMP.

Also, PG&E identified one National Register-eligible site (FDY-MRM-26/P-29-4030) that requires further work to determine if project-related effects are present. PG&E proposes to monitor this site to identify potential project-related effects per section 4.3.5 in the HPMP.

PG&E proposes to avoid and monitor the 10 National Register-eligible sites that are not experiencing project-related effects, as outlined in section 4.3.5 of the HPMP.

PG&E's Proposed Management Measures for Affected Archeological Sites

The 41 archeological sites (8 National Register-eligible sites and 33 sites that are pending National Register evaluation) that are experiencing project-related effects are listed in table 3-245. The table identifies the potential project effects and PG&E's proposed management of effects.

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
Sites (n=8) Eligible for Listing in the National Register with Project-Related Effects			
P-29-0853-H CA-NEV-693-H FS 05-17-56-003 Summit City/Meadow Lake Townsite	Meadow Lake	Recreation use, pot-hunting, road construction, horses, PG&E-managed campground	Monthly monitoring and data recovery to resolve adverse effects.
P-29-4023-H CA-NEV-2036-H FDY-MRM-1	Fordyce Lake	Wave action	Annual monitoring and data recovery to resolve adverse effects.
P-29-4069-H CA-NEV-2069-H SPL-MRM-17	Spaulding Lake	PG&E staging area, modern trash disposal, access road	Same as above.
P-29-4071-H CA-NEV-2071-H SPL-MRM-20	Spaulding Lake	Deflation, wave action	Same as above.
P-29-4090-H CA-NEV-2081-H SPL-MRM-3	Spaulding Lake	Wave action	Same as above.
P-29-4108-H CA-NEV-2091-H SPL-MRM-12	Spaulding Lake	Minimal access road maintenance	Same as above.

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
P-29-4138 CA-NEV-2127-H Spaulding Dam Construction Discontiguous Archeological District	Spaulding Lake	PG&E staging area, trash disposal, access road, deflation, wave action	No monitoring.
P-31-1829 CA-PLA-1418 FS 05-17-55-534	Kelly Lake	Camping	Monthly monitoring. PG&E plans to limit access to the site.
Sites (n=1) Eligible for Listing in the National Register with Undetermined Project-related Effects			
P-29-4030 CA-NEV-2041 FDY-MRM-26	Fordyce Lake	To be determined	Annual monitoring, subsurface testing to determine the extent of the lithic scatter.
Sites (n=14) Proposed for National Register Evaluation 1 to 3 Years Following License Issuance			
P-29-0695-H CA-NEV-613H	Fordyce Lake	Camping; site at high-water line, artifact collection	Monthly monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-2248-H	South Yuba Canal Access Roads	Used as an access road	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4029 CA-NEV-2040 FDY-MRM-25	Fordyce Lake	Erosion, partial inundation, wave action, fishing, deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-29-4031-H CA-NEV-2042-H FDY-MRM-4 FS 05-17-53-931	Fordyce Lake	Wave action, fluctuating water levels, deflation, camping	Monthly monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
P-29-4034-H CA-NEV-2043-H FDY-MRM-10	Fordyce Lake	Fluctuating water levels, wave action, slope erosion	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4037/H CA-NEV-2046/H FDY-MRM-20	Fordyce Lake	Wave action, fishing	Annual monitoring HPMP appendix H HPETP sections 3.3, <i>Historic Archeological Sites</i> , and 3.2.6.2.1, <i>Lithic Scatters</i>
P-29-4038 CA-NEV-2047 FDY-MRM-27	Fordyce Lake	Wave action, erosion, deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-29-4045-H CA-NEV-2052-H FDY-MLM-1	Fordyce Lake	Deflation, OHV	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4052-H CA-NEV-2058-H MDW-MRM-3 FS 05-17-56-591	Meadow Lake	Camping, access road, PG&E staging area	Monthly monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4131 CA-NEV-2096 STR-MLN-1	Sterling Lake	Annual inundation, wave action, some deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4327 CA-PLA-2392 HSP-MRM-08	Halsey Development-powerhouse and afterbay	Graveled staging area	Monitoring every 3 years. HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4377-H CA-PLA-2407-H DMCR-MLN-4	Drum Canal Access Roads	At staging area and located under transmission line with regular brush clearing	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
P-31-4381-H CA-PLA-2411-H DMCR-MLN-8	Drum Canal Access Roads	No project-related effects; ongoing vandalism	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
Sites (n=11) Proposed for National Register Evaluation 2 to 4 Years Following License Issuance			
P-29-4042-H CA-NEV-2051-H FDY-TK-2 FS 05-17-53-937	Fordyce Lake	Wave action; road extends below high-water mark	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4055-H CA-NEV-2060-H MDW-MLM-2 FS 05-17-56-592	Meadow Lake	Dam outlet runoff	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4056-H FS 05-17-56-527	Meadow Lake	Dam outlet runoff	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4063 CA-NEV-2065 FEE-MRM-1 FS 05-17-53-944	Feeley Lake	Deflated, wave action	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4280 CA-PLA-2368 PKU-MRM-1 FS 05-17-57-897	Peak Lakes	Wave action, deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4281 CA-PLA-2369 PKU-MRM-2 FS 07-17-57-898	Peak Lakes	Wave action, deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4282 CA-PLA-2370 PKL-MRM-3 FS 05-17-57-903	Peak Lakes	Wave action	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
P-31-4283 CA-PLA-2371 PKL-MRM-4 FS 05-17-57-899	Peak Lakes	Deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4294 CA-PLA-2377 LVY-MRM-1	Lake Valley reservoir	Wave action, deflation	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4299 CA-PLA-2381 LVY-MRM-6	Lake Valley reservoir	Wave action, fluctuating water levels, deflated soils	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
P-31-4303 CA-PLA-2383 LVY-MRM-9	Lake Valley reservoir	Wave action	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.1, <i>Lithic Scatters</i>
Sites (n=8) Proposed for National Register Evaluation 3 to 5 Years Following License Issuance			
P-29-1585 Segment (a) FS 05-17-53-982	Deer Creek canal forebay	Deer Creek canal forebay head gate floods ditch regularly	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-1653-H FS 05-17-55-367 (a) – (c)	Deer Creek transmission line	Vegetation clearing for transmission line maintenance	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4004 CA-NEV-2035/H FS 05-17-53-983 DCT-MRM-5	Deer Creek transmission line	Vegetation clearing for transmission line maintenance	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4071-H CA-NEV-2071-H SPL-MRM-2	Lake Spaulding	Wave action, deflation	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>

Table 3-245. PG&E proposed management of National Register-eligible and potentially eligible archeological and historic-era resources experiencing project-related effects. (Source: PG&E, 2012b)

Resource Number ^a	Location	Potential Project Effects	PG&E Proposed Management
P-29-4089 CA-NEV-2080-H SPL-MRM-2	Lake Spaulding	Wave action, deflation	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4107/H CA-NEV-2090/H DCT-MRM-4 FS 05-17-53-955	Deer Creek transmission line	Transmission line maintenance	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-29-4229-H DCT-MRM-8	Deer Creek transmission line	Possible vegetation clearing for transmission line maintenance	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-31-4308-H CA-PLA-2416-H NCP-MRM-02	Newcastle powerhouse	Access road maintenance	Annual monitoring HPMP appendix H HPETP section 3.3, <i>Historic Archeological Sites</i>
P-31-5361 CA-PLA-2424 BRCS-MRM-17	Bear River canal spillway channels	Erosion	Annual monitoring HPMP appendix H HPETP section 3.2.6.2.2, <i>Milling Stations</i>

^a Primary, Trinomial (-H = historic; /H = prehistoric and historic; no H or /H = prehistoric), Forest Service, Temporary

Summary of PG&E's Proposed Management of Affected Archeological Sites

PG&E-proposed management for archeological sites with project-related effects includes blocking vehicular access to these sites, posting restrictive signage, closing user-created roads, and conducting annual monitoring of erosion. In addition, PG&E proposes notifying transmission managers and educating employees about sites that may be affected by vegetation management or new transmission line construction. PG&E currently implements an employee environmental and sensitivity training program and proposes to continue this program. PG&E also proposes public education of the cultural significance of the area, as well as use restriction for the protection of resources through interpretive signage, brochures, or other similarly appropriate media. Representatives from the tribes, the Forest Service, BLM, and Reclamation would be asked to participate in the creation of interpretive materials.

PG&E plans to develop and implement a project patrol component within 2 years of license issuance on project and project-affected NFS and BLM lands. At the annual coordination meeting, PG&E would coordinate with the resource agencies and interested parties to review information from the prior recreation season and plan any adjustments for the next season. The seasonal project patrol tasks would include monitoring and reporting vandalism of facilities, including cultural sites, and other resource damage.

SHPO and Tribe Comments on PG&E's National Register Eligibility Determinations and Proposed Management of Archeological Sites

On May 18, 2012, the SHPO provided comments on 2011 *Cultural Resources Investigation of the Drum Spaulding Project, FERC No. 2310, Placer and Nevada Counties, California* (PAR, 2011). The SHPO determined the following:

- One PG&E-recommended ineligible site (P-31-2828H) was previously determined to be eligible for the National Register as a contributor. The SHPO concurrence letter dated December 9, 2011, is referenced in the May 18, 2012, letter.
- Three PG&E-recommended ineligible sites (P-29-1618H, P-29-4062H, P-29-4081H, P-29-4137, P-31-4362H, P-31-4363H, and CA-PLA-519H) have insufficient information to determine eligibility. These sites should be treated as potentially eligible resources and avoided.
- At two multicomponent PG&E-recommended potentially eligible sites (P-29-0718/CA-NEV-0629H and P-29-1550H/CA-NEV-0991H), the historic component is ineligible and the prehistoric component is potentially eligible.
- At P-31-4326H/CA-NEV-2420H the prehistoric component is ineligible. The SHPO did not concur with that the historic component was ineligible as it appears to be part of the Haley afterbay dam complex.
- The sites that PG&E recommended as being contributing sites to the proposed Spaulding Dam Construction Discontiguous Archeological District were eligible properties not as the proposed Spaulding Dam Construction Discontiguous Archeological District.

On June 18, 2012, the UAIC commented on the May 2012 HPMP with the following observations regarding the identification of sites and project-related effects:

- CA-NEV-2041/P-29-4030 is experiencing adverse effects from project operations by wave action, seasonal inundation, and annual drawdowns that have been causing deflation and erosion at this resource. The UAIC requested that “any minute effects should be avoided and the resources preserved and protected.” The UAIC further requested to be present during any monitoring or archeological work at this site.
- One of the unevaluated sites that PG&E states is experiencing project-related effects (CA-PLA-2376/P-31-4293) was misidentified as a milling station and needs to be re-evaluated for religious, ceremonial, and design value using ethnographic research and site testing.
- One of the unevaluated sites that PG&E states is not experiencing project-related effects (CA-PLA-2405/P-31-4375) is experiencing adverse project-related effects,

particularly because of the close proximity to a pit toilet and an interpretative trail. The UAIC requested: (1) that the toilet and interpretative trail be moved as mitigation for adverse effects; (2) like CA-PLA-2376, that the site be evaluated as a sacred, ceremonial, and religious site; and (3) that appropriate consultation and treatment of effects be conducted.

- On June 18, 2012, the Washoe provided review comments on the May 2012 HPMP and HPTP. Site-specific comments included the following:
- The petroglyph site at Fordyce Lake (CA-NEV-2041/P-29-4030) is being adversely affected by water fluctuation.
- Entry #31 in table 4.4.2 mentions “eroding out of Middle Lindsey Dam.” Does this mean that the site is eroding? The Washoe point out that there is no corrective action identified for this eroding site.

On June 21, 2012, the Nisenan Maidu commented on the May 2012 draft HPMP and HPTP. Their comments regarding the identification and evaluation of sites follows:

- CA-NEV-2041/P-29-4030 is a petroglyph and lithic scatter site that is experiencing adverse effects from reservoir inundation and fluctuation. This site was also identified by the Washoe as being adversely affected by water fluctuation.
- Milling stations (CA-PLA-2376 and CA-PLA-2405) are misidentified and need to be re-evaluated as rock art sites.

PG&E’s provided the following responses to the UAIC June 18, 2012, comments on the draft HPMP:

- CA-NEV-2041/P-29-4030. The final HPMP reports that the rock art component of this site is “eligible” for the National Register; however, the lithic scatter component has not been evaluated and would be subject to subsurface testing. The final HPMP also describes that soil around the outcrops is deflating; however, the project effects continue to be reported as “to be determined.”
- CA-NEV-2376/P-31-4293. The final HPMP reports that even though the SHPO already concurred that this site was ineligible, PG&E would review the site records to see whether it should be re-categorized as a rock art site (appendix D, page D-13). However, appendix G, page G-16, indicates that no evaluation is planned for P-31-4293. P-31-4293 is identified as being “PE” (potentially eligible) and that annual monitoring to assess any ongoing changes in site condition is scheduled to occur at this site (appendix I, page I-9). The site remains reported in the final HPMP as a bedrock milling station with 11 slicks, 3 cupules, and 1 flake. PG&E reports that the lithic scatter may continue under vegetation, and the outcrop is at the water’s edge with the high-water mark halfway up the rock; there were no cupules or slicks being affected by wave action. The flake is on beach next to rock in an area subjected to low levels of deflation.
- CA-PLA-2405/P-31-4375. The final HPMP reports this site as a bedrock milling station that is classified as being “PE” for the National Register (final HPMP, appendix G, page G-21). The final HPMP reports that even though the SHPO already concurred that this site was ineligible, PG&E would review the site records to

see whether it should be re-categorized as a rock art site (appendix D, page D-13). However, appendix I, page I-12, indicates that PG&E is planning to monitor P-31-4375 every 3 years to assess site condition. In appendix G, page G-21, PG&E states that there are no project effects at P-31-4375; the site is 25 meters from the recreation area that includes an interpretive trail passing near the outcrop and that a duff layer obscures the ground surface, but associated lithic material is possible.

PG&E provided the following responses to the Washoe June 18, 2012, comments on the draft HPMP:

- CA-NEV-2041/P-29-4030. PG&E provided the same response given above to the UAIC about this site.
- Entry #31 in table 4.4.2. This site consists of artifacts from an unknown location that were redeposited in the fill used to create the dam. The site was determined to be ineligible for the National Register.

PG&E provided the following responses to the Nisenan Maidu June 21, 2012, comments on the draft HPMP:

- CA-NEV-2041/P-29-4030. PG&E provided the response as that given to the UAIC and Washoe above.
- Milling stations. PG&E provided the same response given above to the UAIC:

On July 1, 2012, Mr. Tyrone Gorre, a private citizen but advocating for tribal interests, filed a motion to intervene in the Drum-Spaulding Project relicensing. Mr. Gorre's letter discusses the current water situation in California and provides his view on the effects of hydroelectric developments on the natural environment. Mr. Gorre's letter also describes his participation in the Drum-Spaulding and Yuba Bear Projects relicensing process since 2007. He continues with an outline of "Action Items & Discussion Points" that were divided into four areas: General Public, Property Owner, Native American Fisherman, and Team Lead TCP/Historical Study Group. In the last section identified as "D. Team Lead TCP/Historical Study Group," Mr. Gorre provides the following comments relevant to cultural resources: (1) the Commission should remove PG&E and NID as section 106 monitors during the relicensing; (2) PG&E and NID failed to implement procedures agreed to in the 2008 Historical and TCP study group; (3) verify that information about site is included in the HPMP; and (4) payments should be made the informants as agreed to in the 2008 TCP study group meetings.

Our Analysis

- In accordance with the FERC-approved study plan, PG&E has identified both prehistoric and historic archeological sites and (1) evaluated many of them for their National Register eligibility during the survey phase; (2) determined that some are undergoing project-related effects and require additional fieldwork prior to National Register evaluation; (3) determined that others that are experiencing project-related effects cannot be evaluated for National Register eligibility due to lack of access on private lands; and (4) proposed to treat unaffected sites as if they are eligible, but not formally evaluate them until there is a reason to do so. These later sites would remain unevaluated, but would be routinely monitored for project-related effects. If in the future, these resources cannot be avoided by project-related activities, they would undergo formal National Register evaluations. As a result, PG&E identified

project-related effects for all archeological sites that have been determined to be eligible for the National Register or are pending National Register evaluation. PG&E identified proposed management for sites with project-related effects related to restricting land access to areas with significant archeological sites, conducting monitoring for erosion, providing employees and contractors with information about environmental sensitivity on PG&E lands, providing public education materials, and implementing a seasonal project patrol to monitor and report on vandalism to cultural sites.

- PG&E's response to comments provided by the UAIC about the HPMP are valid. Nevertheless, concerns expressed by the UAIC, the Washoe, and the Nisenan are valid involving site P-29-4030 and could be adequately addressed by PG&E in: (1) completing the National Register evaluation on the lithic scatter component of the site; (2) determining project-related effects on this National Register-eligible site; and (3) proposing and implementing mitigation, if necessary. This site is being adversely affected by the project and more evaluation and proposed protection and mitigation measures would ensure effective management of it. It is also reasonable for PG&E to address the UAIC's concerns for P-31-4293 and P-31-4375 by conducting a National Register evaluation, determining project-related effects, and proposing and implementing mitigation, if necessary, because these sites are, and could be further adversely affected by the project. Furthermore, it is reasonable for PG&E to address the UAIC's and Nisenan Maidu's concerns about the misidentification of milling stations with further review of the site records to determine whether these sites should be re-evaluated under criterion A, B, and C for their religious, ceremonial, and design value and that all testing and ethnographic research on these sites should be done in consultation with Native Americans.
- PG&E's responses to comments provided by the Washoe and Nisenan about the HPMP are also valid.
- Finally, PG&E is consulting further with the SHPO on clarifying the eligibility determinations of Sites P-29-1618, P-31-4362, P-31-4363, P-29-0718, and P-29-1550 and whether recommendation for the proposed Spaulding Dam Construction Discontiguous Archeological District, which would resolve the National Register status concerning these sites. Clarification of the National Register eligibility involving these sites is essential in completing the section 106 process involving this project.

In regards to Mr. Gore's motion to intervene, we note that his July 1, 2012, correspondence to us is similar to earlier correspondences filed by him in May and June 2010, and that the Commission responded back to him on July 16, 2010. With regard to item (1) above, the Commission's response stated that PG&E and NID have been authorized by the Commission to locate cultural resources within their APE, determine if the resources are eligible for the National Register, and identify project-related effects on National Register-eligible cultural resources; furthermore, the Commission is responsible for all findings and determinations made under the section 106 process including making a determination (in consultation with the California SHPO and others) as to whether the licensees have adequately located all potential cultural resources in their APEs, made a good-faith effort in determining their National Register eligibilities to affected historic properties, and provided measures to resolve any identified adverse effects to such properties. The Commission found no reason to remove PG&E and NID from the section 106 responsibilities they have assumed in fulfilling the Commission

requirements under the FPA and NHPA. With regard to the other three items, the Commission stated: (2) PG&E and NID have provided historical and cultural properties recovery and documentation procedures in their HPMPs that will be implemented with the new FERC license; (3) site-relevant information is included in the Drum-Spaulding and Yuba-Bear HPMPs; and (4) the Commission has no authority to require licensees to pay individual informants to obtain information.

Historic Buildings and Structures

PG&E identified 118 historic built environment resources within the APE. A large percentage of these resources are associated with generation of electricity and include dams, powerhouses, canals, switchyards, work and residential camps, tramways, and other features related to the historic development of the project. In addition to the hydroelectric-related resources, 28 non-hydroelectric built environment resources were identified that are over 50 years of age and represent a variety of historic activities. Thematically, these resources are related to transportation development (trails, roads, bridges), ranching (corrals, barns, sheds), recreation (cabins, organizational camps, clubs, and lodges), non-project water conveyance systems, and a historic grave site. Thirteen of the 118 built environment resources were determined to be modern and were not formerly recorded or documented. PG&E proposes to document these modern resources when they become 50 years of age. PG&E proposes a schedule to evaluate these resources that begins in 2015 and ends in 2047, as detailed in appendix L of the HPMP.

PG&E determined that none of the 118 historic built resources in the APE are presently being affected by the project.

Additionally, the project includes several PG&E-managed recreation areas that were constructed after the project reservoirs were built in the 1960s. PG&E proposes to inventory, document, and evaluate these recreation areas for the National Register, as necessary and when appropriate (i.e., if they are determined to be 50 years of age or older), within 5 years following license issuance.

Should other built environment resources within the APE turn 50 years of age during the new license, PG&E proposes to record these resources and evaluate them for eligibility for inclusion on the National Register when and if project O&M activities are planned that could potentially affect them. Though no architectural or engineered historic properties are currently being affected, future potential effects, as related to normal upkeep and maintenance of these types of resources (i.e., window replacement, painting, new plumbing, etc.) are possible. As a result, in addition to the screened undertakings,²⁸ when practical, PG&E proposes to operate and maintain the project according to the guidelines found in the Secretary of the Interior's standards to take into account the management of any potential future effects of undertakings on historic properties or potential historic properties that are of architectural or engineering importance.

If PG&E proposes to rehabilitate, restore, relocate, reconstruct, or otherwise modify any built environment resource that is a historic property, or build new construction within the

²⁸ Screened undertakings are those undertakings that have the potential to affect historic properties, but following appropriate screening, may be determined exempt from further review or consultation under the HPMP. The cultural resources specialist is responsible for screening those individual undertakings that are listed in appendix J of the HPMP to determine whether further consideration is required, or if they may be determined exempt from further review and consultation under the terms of the HPMP.

viewshed of a National Register-eligible or listed historic district, PG&E would submit construction plans for buildings and structures to the SHPO for review and comment. These activities do not apply to the screened undertakings.

Our Analysis

In accordance with the FERC-approved study plan, PG&E evaluated 118 historic built environment resources for potential listing on the National Register. On February 13, 2012, the SHPO's review found that 7 of the built environment resources were eligible for the National Register. These include the Drum-Spaulding Hydroelectric District with 35 contributing resources, the Alta and Deer Creek powerhouses, and 4 non-hydroelectric-related resources: Deer Lake girl scout camp, Dutch Flat coal house, Dutch Flat post office, and Dutch Flat monument. The remainder of the resources were determined to be ineligible to the National Register. PG&E's HPMP appendix G, table 2, shows 3 built environment resources as being either eligible (Abandoned Old Bear River bridge that is listed as Place of Historical Interest [Nevada County #036]) or potentially eligible (ca. 1860 Rock Lake trail and ca. 1900 Meadow Vista barn) for the National Register. These resources are not included on the SHPO list of eligible resources. None of the 118 historic built environment resources are presently being affected by the project.

PG&E also identified 10 modern resources and several post-1960 recreation areas that would be inventoried, documented, and evaluated when they are determined to be 50 years of age or older. Waiting for the modern built environment resources and post-1960 recreational facilities to reach 50 years of age would allow for appropriate evaluation under NHPA and any project effects could be determined based on eligibility for the National Register.

Finally, PG&E's further consultation with the SHPO on clarifying the eligibility determinations of the abandoned Old Bear River bridge that is listed as Place of Historical Interest (Nevada County #036) or potentially eligible (ca. 1860 Rock Lake trail and ca. 1900 Meadow Vista barn) would resolve the National Register status concerning these resources. Clarification of the National Register eligibility involving these resources is essential in completing the section 106 process involving this project.

Traditional Cultural Properties

PG&E reported that, during the TCP consultation, the tribal community pointed out that while there are ongoing and previous effects to the one TCP identified in the project APE, those effects for the most part are not altering the way the people celebrate, dance, and continue to meet and interact at the site (Davis-King, 2011). As discussed in the confidential TCP evaluation, the place is evaluated as eligible under criterion A for its association with ongoing ceremonial and educational activities. The association of the place with these community events and even the spirit of the place have not been altered, according to the community, so that while there appear to be effects to the place, those effects are not adverse. That is, the effects do not diminish the value the place holds for the native community. PG&E determined that project operations had no adverse effect on the TCP.

PG&E states in the HPMP that it is working with the tribes to protect this site and avoid adverse effects. Should unavoidable adverse effects occur to the identified TCP, or to any not-yet-identified TCP, treatment would be negotiated and agreed upon between the SHPO, PG&E, and the relevant tribes or group on a case-by-case basis.

In the TCP report, PG&E identified plants and salmon fishing that are culturally important to the Southern Maidu. Even though significant plant collecting areas may not qualify as National Register-eligible TCPs, they still need to be protected by other statutes, such as NEPA. Along these lines, it would be appropriate for PG&E to include the protection of culturally significant plants in the Vegetation Management Plan. As a result, we address current and planned protection measures for culturally sensitive plants in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*. Similarly, salmon fishing is not a section 106 resource; however, we address current and planned protection measures for salmon in section 3.3.2.2, *Aquatic Resources, Environmental Effects*.

Our Analysis

Upon review of the TCP report, we conclude there is enough information to determine that the one resource (ceremonial and social event center) within the project's APE can be considered as a National Register-eligible TCP. Through the HPMP, PG&E would continue to work with the tribes to alleviate any potential project-related adverse effects to this TCP. If any future TCPs are discovered within the project's APE, PG&E would also engage and consult with the tribes to evaluate and consider measures to protect these resources. We agree with this approach.

Historic Properties Management Plan

Continued project operation and enhancements and new construction could affect cultural resources listed in or eligible for inclusion in the National Register. The purpose of the HPMP is to resolve (i.e., reduce, avoid, or mitigate) existing or potential project-related adverse effects to historic properties within the project's APE for the term of any new license issued for the project.

PG&E provided a first draft of the Drum-Spaulding Project HPMP to the Forest Service, BLM, and tribes for a 30-day review and comment period on August 31, 2010. PG&E met with tribes and agencies on October 6, 2010, to discuss any questions regarding the draft HPMP. PG&E included the HPMP in its license application and provided it to the SHPO for review and comment following a request from FERC in a letter dated January 31, 2011. On May 18, 2012, PG&E issued HPMP binders, including the newly drafted HPTP, for a 30-day review. PG&E held a cultural work group meeting with tribal/agency relicensing participants to review and discuss comments on the HPMP and the HPTP for the Drum-Spaulding Project on May 31, 2012. PG&E filed a final HPMP (dated August 2012) with the Commission on September 25, 2012.

PG&E's HPMP is designed to prescribe specific actions and processes to manage historic properties within the project APE. It is intended to serve as a guide for the licensee's operating personnel when performing necessary O&M activities and to prescribe site treatments designed to address ongoing and future effects on historic properties. The HPMP also describes a process of consultation with appropriate state and federal agencies and tribes regarding the management of historic properties associated with the project APE. Licensee requirements detailed in the HPMP include: appointment of an HPMP Coordinator; training for all O&M staff; routine monitoring of known cultural resources; and periodic review and revision of the HPMP as necessary.

Implementation of the plan would ensure that the effects of the proposed project on cultural resources would be taken into account and the appropriate management measures emplaced prior to imposing any O&M activities on cultural resources. PG&E anticipates that FERC would execute a PA with the SHPO (if the Advisory Council declines to participate) to implement the final Drum-Spaulding Project HPMP upon license issuance. PG&E, the tribes, the Forest Service, and BLM would be invited to participate in the PA as consulting parties.

PG&E's cultural resource management goals emphasize responsible stewardship of historic properties, with avoidance and preservation in place as the principal objectives. Many of the sites that would be managed through the HPMP have not been evaluated for eligibility to the National Register; unevaluated sites would be treated as eligible and managed accordingly, until their status is determined otherwise. PG&E would use qualified tribal cultural monitors during archeological surveys, site testing, and data recovery, non-emergency construction, and maintenance activities requiring ground disturbance that would create a reasonable effect to historic properties, and during long-term historic properties monitoring. Because resource eligibility has not been determined in many cases, PG&E proposes the following general management strategies applicable to numerous situations and property types:

- Avoidance: Proposed undertakings would avoid cultural resources.
- Stabilization and protection: Some sites within the APE may be subjected to project effects, which may be minimized or eliminated through additional management.
- Additional surveys: PG&E intends to survey project lakes and reservoirs during annual outage drawdown, annual lows, or unexpected low (e.g., drought) water levels that result in significantly lower levels than were encountered during the relicensing field studies in 2009 and 2010.
- Site testing and data recovery: Avoidance, stabilization, and protection are not always possible. When effects are unavoidable, site testing and/or data recovery excavations may be the best treatment option.
- Monitoring protocols: Regular monitoring would provide feedback concerning the condition of historic properties, confirming that sites have been avoided as planned, or signaling when additional management measures may be called for.
- Inadvertent discoveries: If such unanticipated discoveries of cultural material or archeological sites are made, the following steps would be taken:
 - All work in the immediate area will cease and all artifacts left in place until PG&E cultural resource specialist (or their designee), Reclamation, BLM, and/or the Forest Service, as appropriate, are able to evaluate the find.
 - If the cultural materials constitute isolated material, PG&E's cultural resources specialist will document the material and the construction activity may continue without any further consultation.
 - If the cultural materials constitute a "site," PG&E's cultural resources specialist or a designee will document the property to current National Park Service standards, and the material will be assumed eligible for the National Register in accordance with 36 CFR 800.13.
 - Following documentation, where feasible, measures will be taken to protect newly discovered sites from further disturbance.
 - PG&E will notify the SHPO and the tribes within 48 hours of the new site discovery in accordance with 36 CFR 800.13(b)(3).

- In accordance with 36 CFR 800.13(b)(3), the SHPO and the tribes will have 48 hours to respond to the notification of a new site discovery. If no response is received within 48 hours, PG&E will assume that no comments are forthcoming and that the SHPO and the tribes concur with the proposed actions, and PG&E may proceed with implementing the actions.
- Following completion of all construction activities, PG&E shall provide to the SHPO, the tribes, the Forest Service as appropriate, and the California Historic Resources Information Center at California State University Sacramento a report of the actions that were undertaken during construction activities and copies of all field documentation and consultation.

PG&E proposes other protocols and procedures in the HPMP involving educating the public and PG&E staff on protecting cultural resources, emergency situations, treatment of human remains, curation of recovered cultural materials, activities that do not require California SHPO involvement, future project studies, and project patrolling, monitoring of cultural resources, and general consultation.

The Forest Service filed 4(e) conditions on August 23, 2012, and BLM filed 4(e) conditions on August 27, 2012. California Fish and Wildlife filed 10(a) recommendations on July 30, 2012. All three filings included similarly stated provisions about PG&E's HPMP. Forest Service condition 43 and BLM condition 21 specify and California Fish and Wildlife measure 19 recommends that PG&E file with the Commission an HPMP that is approved by the Forest Service and BLM and that PG&E consult with the SHPO, the Forest Service, BLM, applicable tribes, and other agencies during the finalization of the HPMP. Additionally, Forest Service condition 43 and BLM condition 21 specify and California Fish and Wildlife measure 19 recommends that the HPMP include requirements for unanticipated archeological and paleontological discoveries that could be identified on Forest Service and BLM land during project activities and that PG&E solicit written approval from the Forest Service or BLM to proceed following a discovery. PG&E filed the final HPMP with the Commission on September 25, 2012.

On August 30, 2012, PG&E filed alternative conditions to the Forest Service and BLM conditions. PG&E states its proposed alternative conditions are sufficient to protect cultural resources. PG&E proposes to follow management measures for inadvertent discoveries as described in section 4.3.6 of the HPMP, which has been reviewed and commented on by the Forest Service, BLM, and the tribes. The HPMP does not require PG&E to solicit written approval from the Forest Service or BLM to proceed following a discovery. Instead, PG&E would follow the procedures set forth in section 4.3.6, *Inadvertent Discoveries*, of the HPMP, as described above. Furthermore, PG&E states that paleontological resources are not cultural resources and, therefore, are not eligible for listing on the National Register and do not qualify as historic properties. PG&E proposes no management measures for paleontological resources in the HPMP.

Reclamation filed a 4(e) condition (b.11) related to the O&M of Newcastle powerhouse on July 30, 2012. Reclamation condition b.11 pertains to the discovery of cultural resources and specifies that PG&E immediately provide verbal notification to a Reclamation authorized official of the discovery on Reclamation lands of any and all antiquities and paleontological items or other objects of archeological, cultural, historic, or scientific interest. PG&E would follow up with a written report of its findings to the Reclamation authorized official within 48 hours. Objects covered by the condition include, but are not limited, to historic or prehistoric ruins,

human remains, funerary objects, and artifacts discovered as a result of PG&E activities. PG&E did not address Reclamation condition b.11 in its alternative conditions filed on August 30, 2012.

Tribes, FERC, Resource Agencies, and SHPO Comments on PG&E's HPMP and HPTP

The UAIC commented on the September 2010 draft HPMP with the following: (1) a request for scientific proof that inundation, fluctuation, and wave action do not deteriorate a rock surface; (2) information about the percentage of land below the high water level mark that was not surveyed for cultural resources; (3) a request for consultation status with the HPMP coordinator, SHPO, FERC, and PG&E; (4) a request for a copy of the PA discussed in section 1.3 of the draft HPMP; (5) a request for participation in sections 5.6.1, *Area of Potential Effects*, 5.6.2, *Identification*, and 5.6.3, *Evaluating Identified Properties*; (6) information about who are the signatories on section 5.6.3.1 (now 5.6.2.1), *Properties Exempt From Evaluation*; (7) clarification that section 5.6.2.2., *Special Consideration for Certain Properties* should not include Native American cultural property that falls under the Native American Graves Protection and Repatriation Act (NAGPRA), Archaeological Resources Protection Act (ARPA), etc.; (8) regarding section 5.6.3.6 *Notifying Indian Tribes*, evaluation reports have not been received by the UAIC; (9) for section 5.8.3, *Finding of Adverse Effect*, section 5.8.4, *Resolving Disagreements Regarding Assessment of Effects*, and section 5.9, *Resolution of Adverse Effects*, a memorandum of agreement is required; and (10) for section 5.10, *Personnel Training*, the UAIC would like to provide qualified monitors to participate in training and fieldwork.

The Nisenan Maidu provided comments on the May 2010 draft HPMP that included the following: (1) the Cultural Context, Ethnography, and Historical sections need improvement; (2) research should include consultation with tribal participants and the Native American Heritage Commission; (3) the HPMP needs to be revisited every 5 years for updating; (4) section 4.2, *Project Effects*, should include monitoring during heavy maintenance which would include notifying the tribes; (5) section 5.2.2, *Special Consideration for Certain Properties*, should fall under cultural laws (NAGPRA, Archaeological Resources Protection Act, etc.); and (6) appendix F, *Archeological Monitoring Schedule*, should include that any new discoveries at a later date will be evaluated and/or included on the monitoring schedule.

The Washoe review of the May 2010 draft HPMP resulted in a comment about section 3.3.1 *Archeological Surveys*. The Washoe questioned whether the Fordyce study and report were completed. PG&E concurred that the HPMP was not complete until the studies and reports are completed.

The Commission reviewed the May 2010 draft HPMP and had eight comments that were adequately addressed by PG&E in the revised (April 2011) HPMP that was filed with the final license application.

The Tahoe National Forest provided comments on the May 2010 draft HPMP as follows: (1) add to section 2.3.2, *Ethnography*, information specific to waterways and site location, the history of the Colfax, Nevada city, and Auburn Rancheria, the importance of fish, and current information from Dr. Tatsch's 2006 research on the Nisenan; (2) add to section 3.1, *Previous Cultural Resources Studies*, all relevant technical studies; (3) section 3.1.3, *Traditional Cultural Properties*, should be specific to the TCP study; (4) section 3.3, *Cultural Resources in the Project APE*, should present the number of ineligible sites, sites to be evaluated, and sites that will not be evaluated but monitored; (5) section 3.3.4, *Other Native American Resources*, should include sites that may or may not be the same as TCPs; and (6) section 4.3, *Proposed Management Measures*, should include additional survey work, employee education, and public education.

The Commission provided two comments on the revised April 2011 HPMP. Both comments requested modification to the April 2011 HPMP to include: (1) a narrative section in the National Register Evaluation Plan in appendix F; and (2) incorporate the results of the remaining studies into the final HPMP and update the National Register Evaluation Plans based on correspondence from the SHPO and other consulting parties.

The Nisenan Maidu and UAIC provided the following verbal comments about the May 2012 HPMP at the May 31, 2012, tribal/agency meeting. Add a footnote in the HPTP about the curation and reuse of cultural material, tribes should be present during site evaluations/reviews, artifacts should be returned to the sites, materials could be curated at the UAIC tribal curation facility, a tribal monitor should be present when activities are conducted at sites, question about why the HPMP says “Native Americans” and “tribes” rather than tribal government or the preferred term “local indigenous people,” the bear paw petroglyph motif information should be added to the HPTP, treatment of human remains should be discussed further in the HPTP, a template of text related to the treatment of human remains can be provided by the UAIC, two sites should be rock art not milling stations, the tribes would like to be involved in the mitigation process, and a question about who has access to the HPMP.

On June 18, 2012, the UAIC filed comments on the May 2012 Drum-Spaulding Project HPMP and HPTP. The UAIC expressed concern about the implementation of the HPMP and HPTP within its ancestral territory and the project’s potential to affect sites and landscapes that may be of cultural significance to the tribe. A summary of UAIC’s specific comments and the May 2012 HPMP and PG&E’s response to the comments follows. The UAIC had comments about additional surveys, monitoring, unevaluated cultural resources experiencing project-related effects, rock art evaluation, anadromous fish, curation, treatment of human remains, milling stations, TCPs, and creative mitigation.

The Washoe’s June 18, 2012, letter regarding the Drum-Spaulding May 2012 HPMP stated the following: concerns about salmon and other flora/fauna components, additional survey work needed at Fordyce Lake, objective quality control for the monitoring plan, protecting site location information, the differentiation between National Register ineligibility and significance for the tribes, clarification of mitigation of project-related effects on unevaluated sites, testing timetable for rock art sites, memorandum of agreement for adverse effects, monitoring protocols, and the preferred artifact recovery methodology.

On June 21, 2012, the Nisenan Maidu commented on the May 2012 draft HPMP and HPTP. Their comments follow: mitigation measures to address adverse effects from recreation; semi-annual checks at recreation areas with cultural sites; potential impacts to sensitive areas during emergency response; having approved local indigenous representatives during site monitoring; conduct updated site reviews when water levels are lower; include tribal participation during additional surveys; preference for leaving artifacts in place or returning them to their original site discovery location; misidentification of rock art sites as milling stations; tribal monitors should be present when inadvertent discoveries are being evaluated and when monitoring rock art sites; clarification that an ineligible site does not mean they are not important to the tribes; add discussion of reworking and reuse of lithic materials and placement in chronology; and consultation for creative mitigation should include tribes.

Our Analysis

The final HPMP filed with the Commission by PG&E and specified by Forest Service condition 43, BLM condition 21, and California Fish and Wildlife measure 19 contains a number of measures to manage and protect historic properties. PG&E responded adequately to the Forest

Service and BLM 4(e) conditions and the California Fish and Wildlife 10(a) recommendation regarding unanticipated archeological and paleontological discoveries. Although section 106 includes no provisions for protecting paleontological resources, the paleontological law enacted by Congress in March 2009 requires all federal land managers to manage and protect paleontological resources discovered on their lands.²⁹ Nevertheless, the Commission in issuing a new license for this project would not have jurisdiction over PG&E to require them to provide measures in the HPMP to protect paleontological resources upon their discovery.

PG&E adequately addressed concerns about the May 2012 HPMP and HPTP expressed by the UAIC, Washoe, Nisenan Maidu, and Tahoe National Forest with the exception of the following: (1) the misidentification of two sites (P-31-4293 and P-31-4375); (2) their determination of eligibility for the National Register, the determination of project effects; (3) and recommendations for the mitigation of adverse effects, if needed.

In addition, PG&E needs to clarify the eligibility status of three built environment resources that the SHPO did not include on the list of eligible resources in the February 13, 2012, letter to PG&E after reviewing the cultural resource inventory and evaluation report. These three resources (Abandoned Old Bear River bridge, ca. 1860 Rock Lake trail, and ca. 1900 Meadow Vista barn) are identified by PG&E in the August 2012 HPMP (appendix G, table 2) as being either eligible or potentially eligible for the National Register.

If PG&E addressed these comments, along with our final recommendations made in chapter 5, their final HPMP (with modifications) would adequately resolve project-related effects to historic properties for the term of a new license. Commission staff would attach the modified final HPMP to a programmatic agreement and execute it with the California SHPO (given that the ACHP declined to comment). In the license order, Commission staff would use a standard license article to implement the PA upon license issuance.

3.3.6.2.3 Yuba-Bear Project

Archeological Resources

NID identified 144 archeological resources (110 sites and 34 isolated artifacts) during the 2008 to 2012 field surveys of the project APE. This included recordation of 14 previously recorded sites and 96 newly discovered sites within the APE.

NID recommended that 72 sites and 34 isolated resources be considered ineligible for inclusion in the National Register, and 1 previously recorded site had been determined to be ineligible for the National Register in 2000. In addition, 36 sites were considered unevaluated pending further research, and 1 previously recorded resource that was identified during the background research was unevaluated because it was not relocated. NID recommended that no archeological sites were eligible for inclusion in the National Register. Table 3-246 presents a summary of the National Register evaluation and a determination of project effects for the 110 sites.

²⁹ See Omnibus Public Land Management Act of 2009, Public Law 111 011, Title VI, Subtitle D on Paleontological Resources Preservation (123 Stat. 1172; 16 U.S.C. 470aaa). This statute requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. Subtitle D includes specific provisions addressing management of these resources by BLM, National Park Service, Reclamation, FWS, and the Forest Service.

Table 3-246. Yuba-Bear Project archeological site evaluation summary. (Source: NID, 2012)

National Register Eligibility	Number of Sites	Project Effect	Number of Sites
Ineligible	73	NA	72
		Previously Recorded Site Determined Ineligible in 2000	1
		No effects	22
Unevaluated	37	Effects – Will be evaluated	14
		Previously Recorded Site Not Relocated and Not Evaluated	1
Eligible	0	Effects	0
		No Effects	0
Total	110		110

Ineligible Sites

NID evaluated 72 archeological sites and the 34 isolated artifacts that were identified within the APE as ineligible for the National Register. One previously recorded site, the Bowman Barracks camp, was previously evaluated as ineligible for listing on the National Register, and the SHPO concurred with this finding in a letter dated July 26, 2000. The formal evaluations of the 72 archeological sites are included in 3 cultural resources inventory and evaluation reports that NID provided in 2011 and 2012 to the tribes, participating THPOs, and agencies for review and consultation, and then to the SHPO for concurrence.

Unevaluated Sites With Project-related Effects

NID identified project-related effects at 14 unevaluated archeological sites. These are five prehistoric sites (lithic scatters and bedrock million outcrops, and rock art); six historic sites (refuse scatters, foundations, rock walls, ditches, and a shed); and three multicomponent sites (prehistoric lithic scatters, a midden, and a bedrock milling outcrop and historic refuse scatters, a check dam, and a concrete foundation). Project-related effects at these sites include recreational activities; campground construction and maintenance; transmission line construction; spillway construction; road maintenance and use; and erosion, deflation, and deflation from fluctuating waters levels.

NID proposes to evaluate formally 12 of the 14 unevaluated sites for listing on the National Register following additional archival research and/or field investigations. The evaluations for potential listing on the National Register would be conducted within 5 years of license issuance and approval of the HPMP, unless routine monitoring indicates that a modified schedule is required to address project-related effects more quickly. NID proposes evaluating one to four sites per year and to begin resolution measures for addressing effects within 3 years of a determination of adverse effect. The proposed plan for further investigations is in appendix I of the HPTP that was prepared in consultation with the tribes, FERC, BLM, and Tahoe National Forest and submitted to the SHPO for review and concurrence. Based on the outcome of the formal National Register evaluations, these sites would be managed following general management measures in section 4.3 of the HPMP. These measures include avoiding sites,

stabilizing and protecting sites, conducting additional survey work when reservoir water levels occur 20 vertical feet lower than they were during the relicensing field surveys; conducting site testing and data recovery excavations if avoidance, stabilization, and protection are not possible; conducting site monitoring to provide feedback about the condition of sites and confirming that sites have been avoided as planned; and initiating the inadvertent discovery process when necessary.

Ongoing heavy disturbances related to camping and other recreational activities were identified at 2 of the 14 unevaluated sites located at Rollins reservoir Greenhorn campground. These sites are currently undergoing formal National Register evaluations that will be presented in a separate report when the evaluations have been completed.

Site-specific project-related effects for the 14 archeological sites that are pending National Register evaluation are listed in table 3-247. The majority of these sites are located at recreational areas along the shoreline of Rollins reservoir (Long Ravine campground, Peninsula campground, and Greenhorn campground), at Faucherie Lake, and at the Jackson Meadows reservoir boat ramp. The remaining three sites are associated with historic occupation and water conveyance at Rollins reservoir, at the Bowman-Spaulding conduit, and at the Bowman-Spaulding transmission line. These sites are being affected by a combination of dispersed recreational use, shoreline vandalism, road and canal maintenance and use, dam construction, and transmission line construction.

NID's proposed management at the 14 unevaluated archeological sites experiencing project-related effects includes avoidance by project O&M activities. If these resources cannot be avoided, NID would follow the procedures outlined in section 4.3.4 of the HPMP. Avoidance means that no activities associated with undertakings may affect historic properties or unevaluated resources, and that activities associated with undertakings may not occur within the resource boundaries, including any defined buffer zones. Portions of undertakings may need to be modified, redesigned, or eliminated to avoid historic properties and unevaluated resources. Buffer zones may be established to ensure added protection where necessary. The use of buffer zones in avoidance measures is particularly applicable where setting contributes to the property's eligibility under 36 CFR 60.4, or where setting may be an important attribute of some types of historic properties (e.g., historic buildings or structures associated with historic landscapes or traditional cultural properties that are important to Native Americans).

In addition to protecting these sites by avoidance during O&M activities, NID proposes to conduct monitoring of these sites by a qualified, professional archeologist. Not all of the historic properties in the APE, however, have the same potential to be affected by the project, so there may be variability in how often a site is monitored. Frequency of monitoring would be based on considerations of accessibility, site type, and proximity to project features and recreational use areas, and would be the product of consultation with tribes, participating THPOs, and agencies, as appropriate. NID provides a monitoring schedule in appendix J of the HPMP.

Following the formal National Register evaluations at these 14 archeological sites, NID proposes to manage the sites following the general management measures discussed in section 4.3 of the HPMP.

NID proposes notifying transmission managers and educating employees about sites that may be affected by vegetation management or new transmission line construction. NID currently implements an employee environmental and sensitivity training program and proposes to continue this program. NID also proposes public education of the cultural significance of the area, as well as use restriction for the protection of resources through interpretive signage,

Table 3-247. NID proposed management for 14 unevaluated archeological and historic-era resources experiencing project-related effects. (Source: NID, 2012)

Resource Number ^a	Location	Potential Project Effects	NID Proposed Management
Sites (n=4) Proposed for National Register Evaluation 1 Year Following License Issuance			
P-31-3839 CA-PLA-2339 AE-YB-2	Rollins reservoir, Long Ravine campground	Recreation	Evaluate because campground use and maintenance are disturbing the site. Monthly monitoring.
P-31-3840 CA-PLA-2340/H AE-YB-3/H	Rollins reservoir, Long Ravine campground	Recreation	Evaluate because campground use and maintenance are disturbing the site. Monthly monitoring.
P-29-3945 CA-NEV-2014 AE-YB-31	Rollins reservoir, Peninsula campground	Recreation; shoreline erosion	Evaluate because observed cultural remains indicate the site likely retains some level of integrity and data potential, but sits below the high waterline where the cultural matrix has been eroded by fluctuating water levels and/or wave action. Annual monitoring.
P-29-3969 CA-NEV-2029 AE-YB-23	Rollins reservoir, Peninsula campground	Recreation; shoreline erosion	Evaluate because fluctuating water levels and/or wave action is eroding site sediments, and the site has been disturbed by construction of the campsites. Monthly monitoring.
Sites (n=4) Proposed for National Register Evaluation 2 Years Following License Issuance			
P-29-3910 CA-NEV-1995H AE-YB-54H	Faucherie Lake day-use recreational area	Recreation; shoreline erosion	The site is experiencing ongoing day-use recreational activity and camping. Monthly monitoring.
P-29-3918 CA-NEV-2002 FS 05-17-56-584 AE-YB-41	Jackson Meadows reservoir boat ramp	Recreation; shoreline erosion	Evaluate. The site sediments are being eroded due to wave action and/or fluctuating water levels. Monitoring every 3 years.
P-29-3919 CA-NEV-2003H FS 05-17-53-923 AE-YB-34H	Faucherie Lake day-use recreational area	Recreation	Evaluate. The site is experiencing ongoing effects from day-use recreational activity and camping. Monthly monitoring.
P-29-3970 CA-NEV-2030 AE-YB-29	Rollins reservoir, Peninsula campground	Recreation; shoreline erosion	Evaluate because observed cultural remains indicate the site likely retains some level of integrity and data potential, but the cultural matrix has been eroded below the reservoir's high water line by fluctuations in the water level and/or wave action. Monthly monitoring.

Table 3-247. NID proposed management for 14 unevaluated archeological and historic-era resources experiencing project-related effects. (Source: NID, 2012)

Sites (n=3) Proposed for National Register Evaluation 3 Years Following License Issuance			
P-29-2044 PAR-S-BSC-1H	Bowman Spaulding conduit (Bowman Lake to Rucker tunnel)	Canal and road maintenance, day- use	Evaluate. Road and canal maintenance has created push piles of debris though the site, which has been razed. Not enough information is currently available to determine eligibility, and the resource's archeological data potential is unknown. Monitoring every 3 years.
P-29-3971 CA-NEV-2031/H AE-YB-4-/H	Rollins reservoir, Greenhorn campground	Recreation; shoreline erosion; and transmission line construction	Evaluate because the site has been disturbed by construction of the transmission line and campground, and fluctuating water levels have eroded and deflated site sediments. Annual monitoring.
P-29-4315 CA-NEV-2125H HDR-YB2-4	Rollins reservoir	Shoreline erosion	Evaluate because fluctuating water levels of the reservoir are eroding the site away. Annual monitoring.
Sites (n=1) Proposed for National Register Evaluation 4 Years Following License Issuance			
P-29-3895 CA-NEV-1991H FS 05-17-53-919 AE-YB-60H	Bowman- Spaulding transmission line	Erosion	Evaluate. The site was disturbed by the construction of a transmission line and is experiencing erosion. Monthly monitoring.
Sites (n=2) With National Register Evaluation In Progress			
P-29-3947 CA-NEV-2016H AE-YB-33H	Rollins reservoir, Greenhorn campground	Recreation	Evaluate because the site contains chronologically sensitive artifacts in indeterminate numbers that are being affected by day-use hikers, picnickers, and recreational camping. Monthly monitoring.
P-29-3953 CA-NEV-2019/H AE-YB-55/H	Rollins reservoir, Greenhorn campground	Recreation; inundation and shoreline erosion	Evaluate because site is being disturbed by campground use and maintenance. Anecdotal evidence suggests the presence of human remains. Integrity is highly variable throughout the site. Monitoring every 3 years. Current measures in place for non-ground-disturbing protection until site is evaluated and, if eligible, treated for effects.

^a Primary, Trinomial (-H = historic; /H = prehistoric and historic; no H or /H = prehistoric), Forest Service, Temporary (AE-).

brochures, or other similarly appropriate media. Representatives from the tribes, Forest Service, and BLM would be asked to participate in the creation of interpretive materials.

NID proposes to develop and implement, within 2 years of license issuance, a project patrol component of its Recreation Plan for project and project-affected NFS and BLM lands. At the annual coordination meeting, NID would coordinate with the resource agencies and interested parties to review information from the prior recreation season and plan any adjustments for the next season. The seasonal Project Patrol tasks would include monitoring and reporting vandalism of facilities, cultural sites, or other resource damage.

Unevaluated Sites without Project-related Effects

No project-related effects were observed at 22 unevaluated sites. These include 5 prehistoric sites (lithic scatter and bedrock milling stations), 16 historic sites (mining complexes; refuse deposits; water conveyance features such as ditches, flumes, dams; hydroelectric-related features such as concrete diversion control gates and spillways; and settlement sites with extant structures), and 1 multicomponent site (prehistoric bedrock milling features and a historic concrete and stone foundation).

As a result, these sites would not be formally evaluated, but would be managed by NID as if they are eligible to the National Register through avoidance and routine monitoring. Monitoring would follow the prescribed protocols described under general management measures in section 4.3 of the HPMP, which includes conducting no ground-disturbing activities within site boundaries; ground-disturbing activities within 30 feet of site boundaries may be monitored by an archeologist. These 22 unevaluated sites would be formally evaluated for listing on the National Register if at any time unavoidable effects from project O&M activities are planned.

Our Analysis

Archeological sites along the shorelines of the project reservoirs (as well those presently inundated) are subject to project-related effects due to erosion from fluctuation in the water level, as well as accidental disturbance from recreational use and vandalism. Project-related road maintenance and use, vegetation management, and recreation all have the potential to affect these sites through direct or indirect effects.

In accordance with the FERC-approved study plan, NID identified project-related effects for all archeological sites that are pending National Register evaluation. At present, there are no National Register eligible archeological sites located within the Yuba-Bear Project APE.

Of the 14 unevaluated archeological sites identified by NID as being subject to project-related effects, 2 are currently undergoing National Register evaluations, and NID proposes to evaluate the remaining 12 within 5 years of license issuance. These National Register-eligibility determinations remain outstanding, but are necessary for compliance with section 106. Requiring NID to make these determinations for the 14 archeological sites that are being affected by the project, in consultation with the SHPO, would ensure that these 14 archeological sites are protected.

NID's proposed management for sites with project-related effects includes restricting land access to areas with significant archeological sites, conducting monitoring for erosion, providing employees and contractors with information about environmental sensitivity on NID lands, and providing public education materials.

Historic Buildings and Structures

Recordation of the historic project system resulted in the identification of 24 features associated with the project. Evaluation, completed as part of the relicensing Historic Properties Study Plan, determined the system to be ineligible for listing on the National Register as a historic district because the features of the system, as a whole, do not convey a unified sense of time and place, nor do they convey architectural interconnectedness. However, two buildings within the project, the Bowman House and the French Lake control house, were evaluated as individually eligible for listing on the National Register. Both the Bowman House and the French Lake control house are actively used by NID as part of project operations. The current use is not affecting those qualities and characteristics that qualify the buildings for listing on the National Register. As a result, each building would continue to be used by NID. However, project O&M would avoid affecting or altering those characteristics of the buildings that qualify them for listing on the National Register. The remaining system features were evaluated individually as ineligible for listing on the National Register; 13 of these system features are modern and would need to be documented and reevaluated when they reach 50 years of age. NID submitted the National Register evaluation of the project system and individual features, including the Bowman House and the French Lake control house, to SHPO for review and comment in a transmittal dated August 19, 2010. The SHPO concurred with these findings in a letter dated November 16, 2010.

Our Analysis

In accordance with the FERC-approved study plan, NID evaluated 24 historic built environment resources for potential listing on the National Register; only 2 are eligible for the National Register; no resources are being affected by the project.

NID also identified 13 modern resources and several post-1960 recreation areas that would be inventoried, documented, and evaluated when they are determined to be 50 years of age or older. Waiting for the modern built environment resources and post-1960 recreational facilities to reach 50 years of age would allow for appropriate evaluation under the NHPA, and any project effects could be determined based on eligibility for the National Register.

Traditional Cultural Properties

NID's TCP study did not identify any TCPs within the Yuba-Bear Project APE (Davis-King, 2011). However, the TCP report describes specific botanical resources that are used by the Southern Maidu in ceremonies and medicine. These include several flowering plants that are gathered for use in dances and ceremonies; coffee berry seeds and Sierra plum pits that are used to make beads; and various berries and plants that are used for purification. The TCP report indicates that these plants continue to be important in dance ceremonies.

The TCP report also stated that "there is a very strong interest in the condition of the salmonid fishery near and in the Project APE." Salmon fishery was very important to the Southern Maidu, and an effort is ongoing by the tribes to identify places within the project that might be associated with traditional salmon fishing areas and activities. Although no areas within the APE were identified, places in the lower reaches of the American and Bear Rivers (outside the APE) are known. Identifying salmon fishing areas and processing sites continues to be an important topic.

NID states in the Yuba-Bear Project HPMP that if potential TCPs are identified within the APE at any time in the future, it would consider this information in consultation with the

SHPO, affected tribes (including any participating THPOs), and land-managing agencies as appropriate, following the procedures and guidelines outlined in the HPMP.

Our Analysis

NID submitted a TCP report for the Yuba-Bear Project. NID found that there were no TCPs present in the APE. In our analysis, we conclude that NID conducted adequate investigations for TCPs; and at this time there appears to be no TCPs present in the APE. NID provided management measures in the HPMP for the protection of TCPs, should any be identified in the future.

The TCP report identified plants and salmon fishing that are culturally important to the Southern Maidu. Even though significant plant collecting areas may not qualify as National Register-eligible TCPs, they still need to be protected by other statutes, such as NEPA. Along these lines it would be appropriate for NID to include the protection of significant plants in the Vegetation Management Plan. As a result, we address current and planned protection measures for culturally sensitive plants in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*. Similarly, salmon fishing is not a section 106 resource; however, we address current and planned protection measures for salmon in section 3.3.2.2, *Aquatic Resources, Environmental Effects*.

Historic Properties Management Plan

Continued project operation and enhancements and new construction could affect cultural resources listed in or eligible for inclusion in the National Register. The purpose of the HPMP is to avoid, reduce, or mitigate (i.e., resolve) existing or potential project-related adverse effects to historic properties within the project's APE for the term of a new license.

NID provided a draft of the HPMP to the Forest Service, BLM, and tribes for a 30-day review and comment period on September 8, 2010, and met with tribes and agencies on October 6, 2010, to discuss any questions regarding the HPMP. Written comments were received from BLM, the Forest Service, and April Moore, a Nisenan/Maidu tribal member on October 27, 2010, and from UAIC between October 1 and 12, 2010. NID addressed the written comments in the revised draft HPMP, which was again provided to tribes and agencies with the draft license application, which was filed with the Commission on November 3, 2010, for a 90-day review. Comments on the HPMP were received from the Washoe Tribe of Nevada and California (December 29, 2010), FERC (January 31, 2011), and the resource agencies (January 28, 2011). On February 11, 2011, NID met with participating tribes and agencies to discuss comments to the HPMP and review status of the relicensing process, including the future schedule. On April 15, 2011, NID filed with the Commission the final license application for the Yuba-Bear Project and subsequently distributed copies of the final license application and HPMP to participating tribes, agencies, and the SHPO. On November 28, 2011, NID notified participants of an upcoming survey around Rollins reservoir due to exceptionally low water levels that were lower than they were during relicensing study efforts. On December 30, 2011, NID filed a letter with the Commission notifying the Commission of the revised submittal date (October 1, 2012) for the HPMP to include the results of the additional survey work at Rollins reservoir. On July 25, 2012, NID distributed the final HPMP to the cultural resources relicensing participants for a 30-day review. NID filed their final HPMP (dated October 2012) with the Commission on November 15, 2012.

Tribes, FERC, Resource Agencies, and SHPO Comments on NID's HPMP and HPTP

The UAIC commented on the September 2010 draft HPMP with the following: they disagreed with the findings of no adverse effects on CA-NEV-2014; a request for scientific proof that inundation, fluctuation, and wave action do not deteriorate a rock surface; a request for a site visits to CA-NEV-2014; reassessment of the eligibility of CA-NEV-2014 as eligible for the National Register; information about the percentage of land below the high water level mark was not surveyed for cultural resources; a request for consultation status with the HPMP coordinator, SHPO, FERC, and NID; a request for a copy of the PA discussed in section 1.3 of the draft HPMP; a request for participation in sections 5.6.1 *Area of Potential Effects*, 5.6.2 *Identification*, and 5.8.3 *Evaluating Identified Properties*; information about who are the signatories on section 5.8.3.1 *Properties Exempt from Evaluation*; clarification that section 5.6.2.2. *Special Consideration for Certain Properties* should not include Native American cultural property that falls under NAGPRA, ARPA, etc.; for section 5.8.3.5 *Consulting with the SHPO*, the UAIC requested to participate in the consultation and that the Washoe and Shingle Springs be included; regarding section 5.8.3.6 *Notifying Indian Tribes*, evaluation reports have not been received by the UAIC; for section 5.9 *Finding of Adverse Effect*, section 5.10.4 *Resolving Disagreements Regarding Assessment of Effects*, and section 5.9 *Resolution of Adverse Effects*, the UAIC feel these require a memorandum of agreement; for section 5.11 *Personnel Training*, the UAIC would like to provide qualified monitors to participate in training and fieldwork; for section 5.13 *Periodic Review and Revision of the HPMP* and section 5.14 *Dispute Resolution*, the UAIC would like to participate in the review.

The Tahoe National Forest provided comments on the May 2010 draft HPMP as follows: section 2.3.2 *Ethnography*, add information specific to waterways and site location, the history of the Colfax, Nevada city, and Auburn Rancheria, the importance of fish, and current information from Dr. Tatsch's 2006 research on the Nisenan; section 3.1 *Previous Cultural Resources Studies*, add all relevant technical studies; section 3.1.3 *Traditional Cultural Properties*, this should be specific to the TCP study; section 3.3.1.4 should identify when it is anticipated that NID will submit the evaluation report on 56 sites to the SHPO; section 3.3.4 *Other Native American Resources*, this should include sites that may or may not be the same as TCPs; and section 4.3 *Proposed Management Measures*, this section should include additional survey work, employee education, and public education; section 4.4.1 should state there are 57 ineligible sites; section 4.4.2 should list the 15 sites that will be evaluated within 5 years; and section 4.4.2 should list the 15 sites that will be monitored.

The BLM comments on the May 2010 draft HPMP as follows: in section 4.1 *Goals for the Project Operation and Historic Preservation*, the BLM believes that any cultural resources that have been or will be affected by project-related activities must be subject to section 106 review including a determination of eligibility. Adverse effects must be resolved: in section 4.3.2 *Stabilization and Protection*, special-use permits are required for ground-disturbing activities on federal land; section 4.3.3 *Site Testing and Data Recovery*, NID needs to clarify what they mean by "site testing" and "data recovery" and the circumstances that NID would undertake these activities; section 4.3.6 *Inadvertent Discoveries* the definition of "less than 5 artifacts per 50 square meters" would be considered exempt from section 106 review; section 4.3.7.1 *Discoveries on Federal Lands*, NAGPRA procedures are the responsibility of the federal land agency not the FERC licensee; also there is no requirement under NAGPRA for the federal agency to consult the Native American Heritage Commission to determine tribal affiliation; and section 4.3.7.2 *NAGPRA Action Plan* needs to be revised to indicate that NID will notify BLM if human remains are identified.

The Nisenan Maidu provided comments on the May 2010 draft HPMP that included the following: the Ethnography and Historical sections need improvement; research should include consultation with tribal participants and the Native American Heritage Commission; section 3.3 *Cultural Resources in the Project APE* reports a low number of sites compared to nearby Drum-Spaulding; section 4.2 *Project Effects* should include monitoring during heavy maintenance which would include notifying the tribes; section 4.3.5 *Monitoring Protocols*, sites that are ineligible should be considered eligible unless there has been major disturbance other than NID-related disturbance; section 4.4.1 *Ineligible Resources*, even though these sites are ineligible the Nisenan Maidu hold cultural value to these sites; and section 5.8.3.4 *Special Consideration for Certain Properties* should fall under cultural laws (NAGPRA, ARPA, etc.).

The Washoe review of the May 2010 draft HPMP resulted in a comment about section 2.3.2.2 with a request for revising the historical context description about the Washoe; section 3.3.1 *Archeological Surveys*, questioned whether the Fordyce study and report completed; section 3.3.3 *TCP*, the Washoe had several comments about the descriptive text; section 4.3.4 *Site Testing* and section 4.3.5 *Monitoring Protocols*, any testing or development of monitoring protocols must be done in consultation with the effected tribes; and section 4.3.9 *Public Education*, the Washoe wish to be included in the development of public education.

The Commission provided 18 comments on the November 2010 HPMP. All comments requested modification to the HPMP; NID updated the HPMP and made the requested changes following Commission guidance.

The following comments were received from the UAIC, the Nisenan Maidu (April Moore), and Marie Rainwater.

Consultation should include the THPOs, why the tribes had not been included on the fall 2011 fieldwork at Rollins reservoir, a request to visit P-29-3945, an editing change to the P-29-3936 designation to include /H; a request for a footnote pertaining to the name “Littlejohn” in the Rollins Reservoir Inventory Report; a request for the UAIC curation facility to be considered for curation; preference for reburial of artifacts at the site; change “12,000” to “12,000 plus years” in the Rollins Reservoir Inventory Report; section 2.2.2.3 in the Rollins Reservoir Inventory Report add genocide/slaver 1849-1910; section 4.3.5 *Site Monitoring*, add a footnote that the tribes must be invited; section 4.0 add tribal involvement for fieldwork; a request that NID add a statement in the HPMP regarding compensation for participation in the monitoring activities; and a request for the timetable for site evaluations and mitigation.

The Tahoe National Forest had only one comment about the July 2012 HPMP, which was a request for a schedule of which sites and when they will be evaluated and mitigated in the HPTP.

The BLM provided two comments on the July 2012 HPMP and the Rollins Reservoir Inventory Report. These comments concern the BLM finding a small unrecorded placer mining site on private land about 120 meters from P-29-3929 and a discrepancy in maps 8 and 9 of appendix D that show cultural resources on the Bear River as being ineligible, which is contrary to the recommendation in appendix H of the HPMP and in the July 2012 Rollins Reservoir Inventory Report that indicate the evaluations are pending.

The purpose of NID’s HPMP is to prescribe specific actions and processes to manage historic properties within the project APE. It is intended to serve as a guide for the licensee’s operating personnel when performing necessary O&M activities and to prescribe site treatments designed to address ongoing and future effects on historic properties. The HPMP also describes a

process of consultation with appropriate state and federal agencies, as well as with Native Americans who may have interests in historic properties within the APE. Licensee requirements detailed in the HPMP include: management measures; training for all O&M staff; routine monitoring of known cultural resources; and periodic review and revision of the HPMP.

Implementation of the HPMP would ensure that the effects of NID's proposed project on cultural resources would be taken into account and the appropriate management measures emplaced prior to imposing any O&M activities on cultural resources. NID anticipates that the Commission would execute a PA with the SHPO (if the Advisory Council declines to participate) to implement the final Yuba-Bear Project HPMP upon license issuance. NID, the tribes, the Forest Service, and BLM would be invited to participate in the PA as consulting parties.

The Forest Service filed 4(e) conditions on August 23, 2012, and BLM filed 4(e) conditions on July 30, and August 27, 2012. California Fish and Wildlife filed 10(a) recommendations on July 30, 2012. All three filings included similarly stated provisions about NID's HPMP. Forest Service condition 43 and BLM condition 38 specify and California Fish and Wildlife measure 19 recommends that NID file with the Commission an HPMP that is approved by the Forest Service and BLM and that NID consult with the SHPO, Forest Service, BLM, applicable tribes, and other agencies during the finalization of the HPMP. Additionally, Forest Service condition 43 and BLM condition 38 specify and California Fish and Wildlife measure 19 recommends that the HPMP include requirements for unanticipated archeological and paleontological discoveries that could be identified on Forest Service and BLM land during project activities and that NID solicit written approval from the Forest Service or BLM to proceed following a discovery.

On August 30, 2012, NID filed alternative conditions for the Forest Service and BLM conditions. NID states that its proposed alternative conditions are sufficient to protect cultural resources, and that NID and the Forest Service and BLM have agreed to continue to negotiate on their differences, which include the following:

- NID plans to file the HPMP prior to, not 1 year after, the issuance of the new license.
- Paleontological resources are not cultural resources and thus are not eligible for listing on the National Register, and therefore, do not qualify as historic properties. NID has not included management measures for paleontological resources in the HPMP.
- NID plans to follow management measures for inadvertent discoveries as described in section 4.3.6³⁰ of the HPMP, which have been reviewed and commented on by the Forest Service, BLM, and tribes. The HPMP does not require NID to solicit written approval from the Forest Service or BLM to proceed following a discovery. Instead, NID would follow the procedures set forth in section 4.3.6 of the HPMP.

Our Analysis

The final HPMP filed by NID and specified by Forest Service condition 43 and BLM condition 38 contains a number of measures to manage and protect historic properties. The avoidance strategies, public and employee training proposals, signage plans, transportation plans,

³⁰ Section 4.3.6 in NID's HPMP is the same as PG&E's section 4.3.6 in their HPMP concerning inadvertent discoveries.

monitoring, and consultation proposals are all measures that would ensure cultural resources and historic properties within the project's APE are protected and maintained throughout the term of any license issued for the project.

The differences between Forest Service condition 43, BLM condition 38, and NID's alternative condition relate to inadvertent discoveries and paleontological resources.

For inadvertent discoveries, the Forest Service specifies that all work cease, then the Forest Service would be notified, and work would not work until NID receives written approval from the Forest Service. NID's alternative condition 43 states that "regarding inadvertent discoveries, NID plans to follow the management measure for inadvertent discoveries as described in section 4.3.6 of the HPMP, which have been reviewed and commented on by the Forest Service, BLM, and Tribes." Section 4.3.6 of the HPMP does not require NID to solicit written approval from the Forest Service or BLM to proceed following a discovery.

For newly discovered paleontological resources, the Forest Service condition calls for these resources to be handled the same as cultural resources. NID's alternative condition 43 does not include any details regarding the handling of newly discovered paleontological resources. Although section 106 includes no provisions for protecting paleontological resources, the paleontological law enacted by Congress in March 2009 requires all federal land managers to manage and protect paleontological resources discovered on their lands.³¹ Nevertheless, the Commission in issuing a new license for this project would not have jurisdiction over NID to require them to provide measures in the HPMP for protecting paleontological resources upon their discovery.

NID adequately addressed concerns about the July 2012 HPMP expressed by the UAIC, Washoe, Nisenan Maidu, Tahoe National Forest, and BLM.

NID's final HPMP would adequately resolve project-related adverse effects to historic properties for the term of a new license. Commission staff would attach the final HPMP to a programmatic agreement and execute it with the California SHPO (given that the ACHP declined to participate), prior to issuance of a license. In the license order, Commission staff would use a standard license article to implement the PA upon license issuance.

3.3.7 Land Use and Aesthetic Resources

3.3.7.1 Affected Environment

Land Use Resources

The Drum-Spaulding Project is located in Nevada and Placer Counties, California. The existing project includes 10 developments—Spaulding No. 3, Spaulding No. 1 and No. 2, Deer Creek, Alta, Drum No. 1 and No. 2, Dutch Flat No. 1, Halsey, Wise, Wise No. 2, and Newcastle. As described in section 2.2.1.1, *Existing Project Facilities, Drum-Spaulding*, the existing project includes 24 on-stream reservoirs, 5 off-stream impoundments, 3 diversion dams, 12 powerhouses,

³¹ See Omnibus Public Land Management Act of 2009, Public Law 111 011, Title VI, Subtitle D on Paleontological Resources Preservation (123 Stat. 1172; 16 U.S.C. 470aaa). This statute requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. Subtitle D includes specific provisions addressing management of these resources by BLM, National Park Service, Reclamation, FWS, and the Forest Service.

various water conduits, generation interconnection transmission lines, and appurtenant facilities and structures. The Drum-Spaulding Project boundary encompasses the project facilities and features described above, as well as primary access roads and other lands necessary for recreation, shoreline management, and the protection of environmental resources.

The Drum-Spaulding project boundary encompasses 5,520.2 acres of land. A portion of the land within the project boundary is owned by the United States and managed by the Forest Service (18 percent or 978.3 acres), the BLM (<1 percent or 10.6 acres), and Reclamation (<1 percent or 5.1 acres). Land ownership within the project boundary is summarized in table 3-248.

Table 3-248. Summary of land ownership within the existing Drum-Spaulding Project boundary. (Source: PG&E, 2011a)

Owner	Acres	% of Total
Forest Service	978.3	18
Bureau of Land Management	10.6	<1
Bureau of Reclamation	5.1	<1
PG&E	3,443.9	62
State	20.4	<1
Other patented non-federal	1,061.9	19
Total federal lands	994.0	18
Total non-federal lands	4,526.2	82

The Yuba-Bear Project is located in Sierra, Nevada, and Placer Counties, California. The existing project includes four developments – Bowman, Dutch Flat, Chicago Park, and Rollins. As discussed in section 2.2.1.2, *Existing Project Facilities, Yuba-Bear*, the Bowman Development includes seven reservoirs, one conduit, one transmission line, and one powerhouse. The Dutch Flat Development includes one diversion impoundment, one reservoir, two conduits, and one powerhouse. The Chicago Park Development includes one reservoir, one conduit, and one powerhouse. The Rollins Development includes one reservoir and one powerhouse. The Yuba-Bear Project boundary encompasses the project facilities and features described above, as well as primary access roads and other lands necessary for recreation, shoreline management, and the protection of environmental resources.³²

The existing Yuba-Bear Project boundary encompasses 6,252.6 acres of land. A portion of the land within the project boundary is owned by the United States and managed by the Forest Service as part of the Tahoe National Forest (25 percent or 1,540.8 acres) and by BLM as the

³² More specifically, the project boundary around the reservoirs is often a contour line a set number of feet above the high water line. In some instances, the project boundary around the reservoirs is defined by surveyed metes and bounds. The project boundary around man-made waterways, including canals, flumes, tunnels, pipelines, and penstocks, is between 25 and 100 feet on each side of the waterway. The project boundary along transmission lines and primary project roads includes 25 feet on either side.

Sierra Resource Management Area (3 percent or 208.5 acres). Land ownership within the project boundary is summarized in table 3-249.

Table 3-249. Summary of land ownership within the existing Yuba-Bear Project boundary. (Source: NID, 2011a)

Owner	Acres	% of Total
Forest Service	1,540.8	25
Bureau of Land Management	208.5	3
Nevada Irrigation District	4,056.3	64
Other private	447.0	7
Total federal lands	1,749.3	28
Total non-federal lands	4,503.3	72

Land uses in the vicinity of the Drum-Spaulding and Yuba-Bear Projects include general agriculture, residential agriculture, forest, residential forest, forest recreation, public, open space, recreation, resort, and timberland production zones. The following plans and county ordinances direct land use and management in the vicinity of the projects.

Tahoe National Forest Land and Resource Management Plan

The Tahoe National Forest encompasses about 800,000 acres within Sierra, Nevada, and Placer Counties, portions of which are located within the boundaries of the Drum-Spaulding and Yuba-Bear Projects. The Tahoe National Forest is managed by the Forest Service in accordance with the Tahoe National Forest Land and Resource Management Plan (LRMP), as amended, for old forest ecosystems, aquatic, riparian, and meadow ecosystems, hardwood ecosystems, fire and fuels management, and noxious weed management. The LRMP establishes forest-specific management areas, each of which has standards and guidelines relating to the Forest Service's Recreation Opportunity Spectrum, Visual Quality Objectives (VQOs), timber management practices, and OHV use assigned to it.

Forest-specific management areas in the vicinity of the Drum-Spaulding Project include Henness, Meadow Lake, Grouse, South Yuba, Meadow, Twenty, Mears, Red, Loch Leven, Yuba Gap, Blue Castle, Chalk, Emigrant, Monumental, Fordyce, and Fuller. Forest-specific management areas in the vicinity of the Yuba-Bear Project include Henness, Milton-Jackson, Pinoli, Bowman, South Yuba, Grouse, Fuller, and Chalk.

Roads within the Tahoe National Forest are managed in accordance with the 2010 Forest Service Motorized Travel Management EIS and Record of Decision. The plan designates roads, trails, and other areas that are open to motor vehicle use on NFS lands. The plan also prohibits the use of motor vehicles off designated roads, trails, and other areas, as well as motor vehicle use not consistent with the designations. Roads that are on NFS lands within the boundaries of the Drum Spaulding and Yuba-Bear Projects are subject to the provisions of this plan.

Additionally, in accordance with Forest Service regulations, a special use authorization or permit is necessary to occupy, use, or build on NFS land, whether the duration is temporary or long term. NID holds two active, Forest Service special use permits related to the expansion of

the Bowman Development (construction, operation, and maintenance of the Bowman powerhouse and Bowman-Spaulding transmission line) on NFS land. PG&E holds eight special use permits from the Forest Service for recreation facilities, road maintenance, and stream gages.

Sierra Resource Management Plan

The BLM lands within the Drum-Spaulding (10.6 acres) and Yuba-Bear (208.5 acres) Projects boundaries are managed in accordance with the Sierra Resource Management Plan. The plan defines the role of BLM in managing and providing open space, safety from wildfire, clean abundant water, economic opportunities, protection and interpretation of the area's rich historical heritage, and diverse, resilient habitats for enjoyment and ecosystem health. In Placer County, the Sierra Resource Management Plan proposed an Area of Critical Environmental Concern proximate to the Yuba-Bear Project.

Nevada County General Plan and County Zoning Ordinance

Nevada County manages private land uses in accordance with the 1996 Nevada County General Plan, as amended. The plan is a long-term development planning guide for the County. The Nevada County zoning ordinance identifies 26 land use categories, 7 of which apply in the vicinity of the projects: general agriculture, residential agriculture, forest, timberland production zone, open space, public, and recreation.

Placer County General Plan and County Zoning Ordinance

The 1994 Placer County General Plan guides the County's long-term land use and development. The plan addresses land use, circulation (transportation), housing, conservation, open space, noise, and safety. The Placer County zoning ordinance provides 14 land use categories, 4 of which are pertinent to the project area: forestry, timberland production zone, resort, and residential forest.

Sierra County General Plan and County Zoning Ordinance

The 1996 Sierra County General Plan, as amended, focuses on elements of open space, conservation, agriculture, and economic development. The goals of the plan are to maintain rural life quality and natural features and functions, foster compatible and historic land uses, and direct development toward those areas already developed. The Sierra County zoning ordinance promotes the regulation of health, safety, and general welfare. Land use categories affecting the projects include: general forest, forest recreation, and timberland preservation zone.

Shoreline Management

There is privately owned land and/or residences along Kidd, Fuller, Rucker, Culbertson, and Rock Creek Lakes at the Drum-Spaulding Project. Currently, there is no private development along any of the Yuba-Bear Project reservoirs. PG&E and NID do not have formal, written shoreline management policies for uses and facilities on lands adjacent to the project reservoirs. Applicant and privately owned lands along the reservoir shorelines are managed in accordance with the applicable county general plan and zoning ordinance. Federal- and state-owned lands along the reservoir shorelines are managed in accordance with the applicable federal or state land management plan. Shoreline development may be allowed when it is consistent with project operational requirements, public safety, the project's recreation plan, and other resource management plans, and is compliant with all federal, state, and local regulations.

Project Access and Roads

PG&E identified 72 road segments, totaling about 50 miles, as primary project roads (table 3-250). Primary project roads are non-general use roads, used primarily for the project, located within the project boundary on NID, Forest Service, BLM, Reclamation, and private lands. The surface of the majority of the primary project roads is native rock/soil and/or gravel. Some road segments are asphalt. Of these primary project roads, 75 percent are considered to be in good or excellent condition and 25 percent in poor condition. Poor road conditions are attributed to the condition of road crossings, drainage features, or environmental conditions, such as erosion/landslides and the presence of hazardous trees. PG&E also identified certain recreation access roads, primary campground circulation loops, and parking areas on NFS lands (table 3-251) that provide access to the project.

Table 3-250. Drum-Spaulding primary project roads. (Source: PG&E, 2011a)

Road Name	Road ID ^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Carr-Lindsey Road ^b	DS001	0.00	2.75	Forest Service, PG&E, and private	2.75	Native rock
Upper Lindsey Lake Road ^b	DS002	0.00	0.46	PG&E	0.46	Native rock
Lower Peak Road ^b	DS004	0.00	0.38	PG&E and Forest Service	0.38	Native rock
Lang's Crossing Spillway Road ^b	DS005	0.00	0.62	PG&E and private	0.61	Native rock
Drum Canal/YB-28 Access Road ^b	DS006	0.00	0.56	PG&E	0.56	Gavel/rock
Chicken Ladder Road ^b	DS007	0.00	1.29	Private and PG&E	1.293	Gravel/rock
Burnt Point Road ^b	DS007-1	0.00	0.06	PG&E	0.06	Gravel
Drum Canal Access Road ^b	DS007-3	0.00	0.30	PG&E	0.30	Native rock
Drum Canal/US Highway 20	DS008	0.00	0.53	PG&E and private	0.54	Gravel
Lake Valley Diversion Dam Road	DS009	0.00	0.72	Private	0.72	Native rock
Drum Canal Road	DS010	0.00	4.0	PG&E, Forest Service, and private	4.0	Gravel

Table 3-250. Drum-Spaulding primary project roads. (Source: PG&E, 2011a)

Road Name	Road ID^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Drum Canal Access Road ^b	DS011	0.00	1.72	PG&E	1.72	Gravel
Camp 2 Road	DS013	0.00	1.17	PG&E and Forest Service	1.17	Gravel
PG&E Access Road	DS014	0.00	0.47	PG&E	0.47	Native rock
Drum Canal Rd/ Old Highway 40	DS015	0.00	1.67	PG&E	1.67	Native rock
Pittman Spill Channel North Road ^b	DS017	0.00	1.87	PG&E and private	1.87	Native rock
Pittman Spill Channel South Road ^b	DS0018	0.00	1.47	PG&E	1.47	Native rock
Drum Canal Road/Drum Forebay Road	DS020	0.00	0.81	PG&E	0.81	Gravel
Drum #3 Penstock Access Road ^b	DS021	0.00	0.24	PG&E	0.24	Native rock
Wheel House Road ^b	DS022	0.00	0.52	PG&E	0.52	Native rock
Access Road ^b	DS023	0.00	0.48	PG&E	0.48	Native soil
Downstream End of Little Tunnel Road	DS026	0.00	1.00	Private and Forest Service	1.0	Native rock
Telephone House Road	DS027	0.00	0.73	Private	0.73	Native soil
South Yuba Canal Access Road ^b	DS028	0.00	0.69	Private	0.69	Native rock
Canal Road	DS029	0.00	0.34	Forest Service	0.34	Native rock
Downstream Steepollow 1 Road	DS030	0.00	1.35	Forest Service and private	1.34	Native rock
East Excelsior Point Road ^b	DS031	0.00	1.33	Forest Service and private	1.34	Native rock

Table 3-250. Drum-Spaulding primary project roads. (Source: PG&E, 2011a)

Road Name	Road ID ^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Growers Road	DS032	0.00	0.22	Forest Service	0.22	Native soil
Chalk Bluff Spur Road	DS035	0.00	0.79	Forest Service	0.79	Native rock
Big Tunnel Spring Road	DS036	0.00	0.37	Forest Service	0.37	Native soil
Deer Creek Spur Road	DS037	0.00	0.39	Forest Service	0.39	Native soil
Deer Creek Spur Road	DS038	0.00	0.49	Forest Service	0.49	Native soil
South Yuba Canal Access Road ^b	DS039	0.00	0.79	Forest Service	0.79	Native rock
Drum Powerhouse Road	DS041	0.00	4.36	Forest Service, private, and PG&E	4.78	Paved
Dutch Flat Surge Tank Road ^b	DS042	0.00	0.60	PG&E, private, and Forest Service	0.6	Native rock
Simpson Spill Access Road	DS045	0.00	2.01	Private	2.01	Native soil
Downstream End of Meadow Gate Road	DS046	0.00	1.43	Private	1.43	Gravel
Wise Tunnel 7, 8, and 9 Access Road	DS047	0.00	1.02	PG&E and private	1.02	Gravel
Fiddler Green Flume Access Road	DS048	0.00	0.33	PG&E and private	0.33	Native rock
Rock Creek Road	DS051	0.00	0.26	PG&E and private	0.27	Gravel
Rock Creek Arch Dam Road	DS051-1	0.00	0.26	PG&E	0.26	Native rock
Newcastle Power House Road	DS052	0.00	0.64	Private, PG&E, and Reclamation	0.64	Gravel

Table 3-250. Drum-Spaulling primary project roads. (Source: PG&E, 2011a)

Road Name	Road ID^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Deer Creek Spur Road	DS053	0.00	0.28	BLM and PG&E	0.28	Native rock
Feeley Lake Road ^b	DS054 ^b	0.00	0.27	Forest Service	0.27	Native rock
Feeley Lake Road ^b	DS055	0.00	0.05	Forest Service	0.05	Gravel
Lake Spaulling Road	DS056	0.00	1.05	Private and PG&E	1.05	Paved
Drum Forebay Road	DS057	0.00	0.12	PG&E	0.12	Native rock/Gravel
Drum Forebay Road	DS058	0.00	0.18	PG&E	0.18	Gravel
Drum Butterfly Valve House Road ^b	DS059	0.00	0.09	PG&E	0.09	Gravel
Boot Road ^b	DS060	0.00	1.17	Forest Service	1.17	Gravel
Downstream of Boot Road	DS060-2	0.00	0.26	Forest Service	0.26	Native soil
Downstream of Boot Road	DS060-3	0.00	0.02	Forest Service	0.02	Native rock
Steepphollow Road	DS060-4	0.00	0.04	Forest Service	0.04	Native rock
13 Mile Spill Road	DS060-5	0.00	0.47	Forest Service	0.47	Native rock
13 Mile Spill Road	DS060-6	0.00	0.03	Forest Service	0.03	Gravel
Spaulding No. 3 Power House Header Box Access Road ^b	DS062	0.00	0.45	PG&E	0.45	Native soil
Alta Power House Road	DS063	0.00	0.21	PG&E and Private	0.21	Gravel
Canal Road	DS064	0.00	0.36	Forest Service	0.36	Native soil
Upper Access to YB-34 Road ^b	DS067	0.00	0.01	Forest Service and PG&E	0.70	Native soil

Table 3-250. Drum-Spaulding primary project roads. (Source: PG&E, 2011a)

Road Name	Road ID^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Boardman Diversion Dam Road	DS069	0.00	0.11	Forest Service	0.11	Native rock
Little Tunnel Road	DS071	0.00	0.18	Forest Service	0.18	Native soil
Spillway Access Road ^b	DS074	0.00	0.17	Forest Service	0.17	Native rock
Chalk Bluff Spur Road	DS075	0.00	0.26	Forest Service	0.26	Native soil
Deer Creek Road	DS076	0.00	0.32	PG&E and BLM	0.32	Native soil
Bear River Canal Access Road	DS077	0.00	0.19	Private	0.19	Gravel
Krause Flume Access Road	DS078	0.00	0.28	Private	0.28	Native soil
Bowman Yard Rd	DS080	0.00	0.27	PG&E	0.27	Native soil
Bowman Yard Road	DS081	0.00	0.08	PG&E and private	0.08	Gravel
Downstream End of Little Tunnel Road	DS082	0.00	0.71	Forest Service	0.71	Native soil
Downstream End of Little Tunnel Spur Road	DS082-1	0.00	0.10	Forest Service	0.10	Native soil
South Yuba Canal Access Road ^b	DS083	0.00	0.07	Forest Service and PG&E	0.07	Native soil
Bear Valley Spill Rd – South Yuba Canal Access	DS084	0.00	0.04	Forest Service and PG&E	0.04	Native soil

^a Road ID pertains to the road segment designation used in PG&E's proposed Transportation Management Plan.

^b PG&E proposes to amend the project boundary to include these road segments. These road segments are part of the proposed project.

Table 3-251. Drum-Spaulding recreation roads on NFS lands. (Source: PG&E, 2011a)

Project Recreation Area	Recreation Facility Name
Meadow Lake	Meadow Lake Campground Meadow Knoll Group Campground Meadow Lake Shoreline Campground Meadow Lake Day Use Area
Lake Sterling	Lake Sterling Picnic Area
Lower Lindsey Lake	Lower Lindsey Lake Campground Lindsey Creek Campground
Fuller Lake	Fuller Lake Day-Use Area and Boat Launch
Rucker Lake	Rucker Lake Drive-In Campground
Lower Peak Lake	Lower Peak Lake Primitive Campsites

NID identified 23 road segments, totaling about 17 miles, as primary project roads (table 3-252) located within the project boundary on NID, Forest Service, BLM, and private lands. The surface of the majority of the primary project roads is native rock/soil and/or gravel. Of the primary project roads, 64 percent are considered to be in excellent condition and 36 percent to be in poor condition. NID also identified certain recreation access roads, primary campground circulation loops, and parking areas on NFS lands (table 3-253) that provide access to the project.

Table 3-252. Yuba-Bear primary project roads. (Source: NID, 2011a)

Road Name	Road ID^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Bowman-Spaulding Berm Road	YBBSC_001	0.00	0.942	NID and private	0.9	Gravel/asphalt /native
Texas Creek Diversion Access Road	YBBSC_003	0.00	0.358	NID	0.4	Gravel
Box Car Section Road	YBBSC_004	0.00	1.325	Forest Service and private	1.3	Gravel
Bowman-Spaulding Berm Road	YBBSC_006	0.00	3.508	Forest Service, PG&E, and private	3.5	Gravel
Bowman Powerhouse Access Road	YBBPH_001	0.00	0.36	NID	0.4	Gravel

Table 3-252. Yuba-Bear primary project roads. (Source: NID, 2011a)

Road Name	Road ID ^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Chicago Park Forebay Road	YBCPF_001	0.00	0.1745	BLM and private	1.7	Gravel/native
Chicago Park Forebay Road	YBCPF_003	0.00	0.180	BLM and private	0.2	Native
Chicago Park Powerhouse/ Access Road	YBCPH_001	0.00	0.159	NID and BLM	0.2	Asphalt
French Lake Road	YBFL_001	0.00	2.092	Private, Forest Service, and NID	2.1	Native
Rollins Dam Spillway Access Road	YBRDS_001	0.00	0.934	NID	0.9	Native
Connroy Place	YBRMS_001	0.00	0.062	NID	0.1	Gravel
Rollins Powerhouse Access Road	YBRPA_001	0.00	0.133	NID	0.1	Asphalt
Low Level Outlet Access Road	YBJMO_001	0.00	0.153	Forest Service	0.2	Gravel
Pipeline Outlet Access Road	YBMBP_001	0.00	0.978	Forest Service and NID	1.0	Native
Wilson Creek Diversion Road	YBWCD_001	0.00	0.185	Forest Service	0.2	Native
Bowman Dam Access Road	YBBND_001	0.00	0.336	Forest Service	0.3	Native /gravel
Bunkhouse Road	YBBNK_001	0.00	0.11	Forest Service	0.1	Gravel
Dutch Flat No. 2 Conduit Intake Access Road	YBDFI_001	0.00	0.383	Forest Service and PG&E	0.4	Native
“B” Alarm Road	YBBAL_001	0.00	1.484	PG&E and Forest Service	1.5	Native
Stump Canyon Intake Access Road	YBSCS_001	0.00	0.823	PG&E and Forest Service	0.9	Native

Table 3-252. Yuba-Bear primary project roads. (Source: NID, 2011a)

Road Name	Road ID^a	Mile Marker- Start (mi)	Mile Marker- End (mi)	Land Ownership	Total Length (mi)	Surface Type
Stump Canyon Siphon Low Level Valve Access Road	YBSCS_002	0.00	0.156	PG&E	0.12	Native
Stump Canyon Siphon Outlet Access Road	YBSCS_003	0.00	0.691	NID and Forest Service	0.7	Gravel
Canal Access Road	YBZION_00 1	0.00	0.322	PG&E	0.3	Gravel

^a Road ID pertains to the road segment designation used in NID's proposed Transportation Management Plan.

Table 3-253. Yuba-Bear recreation roads on NFS lands. (Source: NID, 2011a)

Road ID Number	Forest Service ID Number	Project Reservoir	Recreation Facility	Total Length (mi)
RR01	70-80-10	Jackson Meadows	East Meadow Campground	0.505
RR02	TBA	Jackson Meadows	Pass Creek Campground	0.305
RR03	301-65-1	Jackson Meadows	Pass Creek Overflow Campground	0.150
RR04	301-65	Jackson Meadows	Pass Creek Boat Launch	0.330
RR05	301-55	Jackson Meadows	Aspen Group Campground	0.185
RR06	301-52	Jackson Meadows	Aspen Picnic Area	0.215
RR07	TBA	Jackson Meadows	Sanitary Dump Station	0.110
RR08	TBA	Jackson Meadows	Jackson Meadows Vista	NA
RR09	956-2	Jackson Meadows	Woodcamp Access Road	0.730
RR10	TBA	Jackson Meadows	Findley Campground	0.295

Table 3-253. Yuba-Bear recreation roads on NFS lands. (Source: NID, 2011a)

Road ID Number	Forest Service ID Number	Project Reservoir	Recreation Facility	Total Length (mi)
RR11	TBA	Jackson Meadows	Fir Top Campground	0.180
RR12	TBA	Jackson Meadows	Woodcamp Campground	0.265
RR13	TBA	Jackson Meadows	Woodcamp Picnic Area	0.180
RR14	TBA	Jackson Meadows	Woodcamp Boat Launch	0.155
RR15	TBA	Jackson Meadows	Silvertip Group Campground	0.180
RR16	956-15	Jackson Meadows	Administrative Site	0.145
RR17	TBA	Milton Diversion Impoundment	Day-Use Area/Hand Launch	NA
RR18	TBA	Milton Diversion Impoundment	Primitive Campsites	NA
RR19	TBA	French Lake	No facilities	NA
RR20	TBA	Bowman Lake	Bowman Lake Campground and Boat Launch	0.310
RR21	TBA	Sawmill Lake	Sawmill Lake Family Campground	NA
RR22	TBA	Sawmill Lake	Sawmill Lake Group Campground	NA
RR23	TBA	Canyon Creek	Canyon Creek Campground	0.280
RR24	TBA	Faucherie Lake	Faucherie Lake Group Campground	0.065
RR25	TBA	Faucherie Lake	Faucherie Lake Day Use and Boat Ramp	0.145

Public Safety and Law Enforcement

PG&E has a formal relationship with the Placer County Sheriff's office, which allows the Placer County Sheriff to enforce civil and criminal codes on PG&E property without PG&E being present. PG&E also cooperates with Nevada County and the Forest Service to allow its law enforcement agents the rights to access and enforcement on PG&E property.

NID does not have any formal agreements with local law enforcement agencies for law enforcement on project lands.

Fire Risk and Prevention

The potential for wildfires and associated destruction exists within the Drum-Spaulding and Yuba-Bear Project areas. During the period June 2000 through August 2009, the Forest Service documented 70 wildfires that burned a total of 84.1 acres within a 1-mile buffer of the Drum-Spaulding Project. Campfires were the common cause of the wildfires; no wildfires were related to operation and maintenance of the project. Additionally, in 2001, there was a fire (not documented by the Forest Service) that destroyed two short sections of the Drum-Spaulding Project Lake Valley canal flume and about 2,500 acres. The cause of the fire was a campfire at a nearby recreation area on Forest Service lands. During the period June 2000 through August 2009, the Forest Service documented 37 reported fire ignitions within a 1-mile buffer of the Yuba Bear Project, on a total of 19 acres. More than half (27) of the ignitions were related to campfires; no ignitions were related to the operation and maintenance of the project.

PG&E and NID take measures to prevent wildfires, which include following federal, state, and local rules and regulations. PG&E's and NID's crews are not trained in forest fire suppression and are not required to fight fires. While working in the field, crew vehicles and contractor vehicles follow emergency response preparedness requirements. Vehicles are required to have a shovel, 5-gallon back pump, and chemical fire extinguisher at all times while in the field. Additional, specialized equipment may be required, and certain restrictions may apply during work that involves burning debris. In the case of an emergency, the appropriate emergency response agencies are notified.

Aesthetic Resources

The Drum-Spaulding and Yuba-Bear Projects are located in Nevada and Placer Counties, California, with a portion of the Yuba-Bear Project also located in Sierra County, California. The projects are located on private land, NFS land, and public land administered by BLM. The Drum-Spaulding Project is also located on public land administered by Reclamation. The facilities and features of both projects are located in the northern Sierra Nevada and Sierra Nevada foothills, which generally provide a wooded, natural, scenic backdrop.³³ The South Yuba River (39 miles) is designated as a California Wild and Scenic river, which adds to the visual quality of the area.

Land management activities on NFS lands must meet specific VQOs as established by the Tahoe National Forest LRMP. The pertinent VQOs within the Drum Spaulding and Yuba-Bear Project boundaries include "Retention," "Partial Retention," and "Modification." The

³³ The main exception to the characterization of the landscape as natural are the two reservoirs, three powerhouses, and several miles of canal located in the vicinity of the city of Auburn where the landscape is more residential and commercial.

Retention VQO allows management activities that are not visually evident. The Partial Retention VQO allows management activities that remain visually subordinate to the characteristic landscape. The Modification VQO allows management activities that may visually dominate the original characteristic landscape, but activities that alter vegetative and land form must borrow from the naturally established form, line, color, or texture and be at an appropriate scale. The Forest Service VQOs apply to existing and proposed project facilities on NFS lands within the project boundaries.

The Sierra Resource Management Plan establishes Visual Resource Classes (VRCs) on land administered by BLM, and land management activities on BLM lands must meet the specific VRCs. VRC objective III directs land management activities to partially retain existing character. VRC objective III applies to existing and proposed project facilities on BLM lands within the Drum-Spaulding and Yuba-Bear Project boundaries.

The Resource Management Plan directs the management of public lands administered by Reclamation. Lands proximate to the Drum-Spaulding Newcastle powerhouse are administered by Reclamation. Reclamation does not have a system for evaluating scenic values.

The Nevada, Placer, and Sierra County general plans, discussed in previously in this section, also have goals to maintain or enhance the visual quality of the land, with an emphasis on protecting views from scenic highways.

Drum-Spaulding Project

To determine if Drum-Spaulding Project facilities are in compliance with visual direction from the Forest Service, BLM, and Reclamation, 52 project facilities were assessed using those agencies' visual assessment protocols. All of the facilities meet the Forest Service's land management visual direction, as outlined in the Tahoe National Forest LRMP, from background and most from middle ground with the exception of certain penstocks that are painted silver and are in strong contrast to the surrounding landscape. At a viewing distance of about 2 miles, larger project dams, such as Lake Spaulding and Lake Valley dams, start to show contrast with the surrounding landscape. Other linear facilities, such as transmission lines and canals, generally are not visible and generally meet land management visual direction, with the exception of a few immediate foreground situations. Of the 12 project powerhouses, only 1 powerhouse, the Newcastle powerhouse, is located on public land and presents a contrast to the foreground views from an equestrian trail and Folsom Lake. Of the remaining 11 powerhouses, 6 are visible to the public, 5 of which (Drum no. 1, Dutch Flat no. 1, Spaulding no. 3, Halsey, and Wise) are of traditional architecture and are quite visible due to their traditional light yellow buff color. These powerhouses contribute to the landscape from a historical perspective.

Yuba-Bear Project

To determine if Yuba-Bear Project facilities are in compliance with visual direction from both the Forest Service and BLM, 23 project facilities were assessed using those agencies' visual assessment protocols. All of the facilities meet the Forest Service or BLM land management visual direction from the back and middle grounds. At around 2 miles, Sawmill Lake dam and Dutch Flat no. 2 conduit meet land management visual direction. However, at this same distance, the larger dams, such as Jackson Meadows and Rollins dams, start to show contrast with the surrounding landscape. The Bowman-Spaulding conduit, Bowman-Spaulding transmission line, and Jackson Lake dam meet, with few exceptions, the land management visual direction, because these facilities are generally not seen and are rarely viewed by the public. The rest of the project

facilities do not meet land management visual direction in the foreground or immediate foreground.

3.3.7.2 Environmental Effects

Land Use Resources

Drum-Spaulding Project

Changes to Existing Facilities and the Project Boundary—PG&E proposes the following changes to the existing project facilities and the project boundary:

- Retirement of the Alta powerhouse unit 2;
- Decommissioning of the Jordan Creek diversion; and
- Inclusion of certain new and rehabilitated recreation facilities.

PG&E proposes to officially retire Alta powerhouse unit 2, which ceased operations in 2007 and is hydraulically disconnected from the penstock. The retirement of unit 2 at the Alta powerhouse would not physically change the project boundary.

PG&E also proposes to decommission the Jordan Creek diversion and related conveyance system because the facilities are not necessary for current or future operations. These facilities would be removed from the project and would no longer be within the project boundary.

Additionally, PG&E proposes to include certain roads and new and/or rehabilitated recreation facilities at Meadow Lake, Lake Sterling, Fordyce Lake, Lake Spaulding, Lower Lindsey Lake, Fuller Lake, Lower Peak Lake, Lake Valley reservoir, and Wise forebay within the project boundary.

Land ownership within the Drum-Spaulding existing and proposed project boundaries is summarized in table 3-254.

In an order dated October 5, 2012, the Commission approved certain Phase I project boundary adjustments at the project. The Phase I adjustments were related to a transmission line separation, geographic information system (GIS) conversion, and former actions requiring map updates. In a letter dated September 10, 2012, the Forest Service requested that any future, or Phase II, project boundary adjustments, specifically related to roads and recreation facilities, be consistent with final 4(e) conditions for the project.

Table 3-254. Summary of land ownership within the existing and proposed Drum-Spaulding Project boundary. (Source: PG&E, 2011a)

Owner	Existing Project		Proposed Project	
	Acres	% of Total	Acres	% of Total
Forest Service	978.3	18	1,128.9	21
BLM	10.6	<1	5.6	<1
Reclamation	5.1	<1	5.3	<1
PG&E	3,443.9	63	3,409.5	65
State	20.4	<1	20.1	<1
Other patented non-federal	1,061.9	19	682.1	13
Total federal lands	994.0	18	1,139.8	22
Total non-federal lands	4,526.2	82	4,111.7	78
Total	5,520.2	100	5,251.5	100

Our Analysis—PG&E’s proposed changes to the project boundary would decrease the area within the project boundary by about 270 acres. The proposed project would continue to encompass lands owned by the United States and managed by the Forest Service, BLM, and Reclamation. The Jordan Creek Diversion and related conveyance system would be removed from the project boundary because these facilities are not necessary for current or future operations. The proposed project boundary would continue to encompass all facilities and features necessary for the operation of the project, including all primary project roads and existing, new, and/or rehabilitated recreation areas and recreation access roads. It is necessary that all primary project roads, including recreation access roads, and recreation areas be included in the licensed project boundary so the Commission has the authority to ensure that PG&E maintains adequate and safe public access to project lands and waters.

Transportation Management Plan—The roads used by PG&E to access project facilities are federal (Forest Service, BLM, and/or Reclamation), state, county, and/or private roads.

PG&E filed a Transportation Management Plan on April 12, 2011, and a revised Transportation Management Plan on August 29, 2012. PG&E proposes to implement the Transportation Management Plan, as approved by the Commission, within 1 year of license issuance. The plan describes the scope of road improvements needed for road design, construction, and maintenance, including road planning, road rehabilitation, and road operation and maintenance for the primary project roads identified in table 3-250. Additionally, PG&E proposes to treat certain identified recreation roads with the same level of maintenance provided to primary project roads. Generally, recreation roads include recreation access roads, primary campground circulation loops, and parking areas. The plan includes an implementation schedule and discusses ongoing monitoring.

Forest Service 4(e) condition 44 specifies that, within 1 year of license issuance, PG&E file with the Commission a Road and Transportation System Management Plan, approved by the Forest Service, for the protection and maintenance of project and project-affected roads that are on or affect NFS lands. The Forest Service specifies that PG&E should consult with the Forest

Service and other affected parties in the development of this plan. The Forest Service specifies that the plan should include identified project roads and recreation roads and should address: planning and inventory; operation, maintenance, and road-associated debris; construction and reconstruction; and monitoring. PG&E should take appropriate measures to meet Forest Service maintenance level, traffic service level, and road management objectives. Upon Commission approval, PG&E should implement the plan.

BLM 4(e) condition 22 specifies that, within 1 year of license issuance, PG&E file with the Commission a Transportation System Management Plan, approved by BLM, for the protection and maintenance of project and project-affected roads that are on or affect BLM lands. BLM specifies that PG&E should consult with BLM and other affected parties in the development of this plan. BLM specifies that the plan should include identified project roads and should address: planning and inventory; operation, maintenance, and road-associated debris; construction and reconstruction; and monitoring. PG&E should take appropriate measures to meet BLM maintenance level, traffic service level, and road management objectives. Upon Commission approval, PG&E should implement the plan.

Generally consistent with Forest Service 4(e) condition 44, California Fish and Wildlife measure 20 recommends that, within 1 year of license issuance, PG&E file with the Commission a Road and Transportation Facility Management Plan, approved by the Forest Service, for the protection and maintenance of project and project-affected roads that are on or affect NFS lands.

As an alternative to Forest Service 4(e) condition 44 and BLM 4(e) condition 22, PG&E proposes to implement the Transportation Management Plan filed with the Commission on August 29, 2012.

Our Analysis—Roads in the project area are operated and maintained by different entities, including the Forest Service, BLM, the state, the counties and/or private organizations. These roads are shared by many different users at varying use levels. The Forest Service and BLM use these roads to access federal lands and resources. PG&E uses many of these roads to access project facilities. Others, such as recreationalists, use these roads to access recreational facilities available at the project and on NFS lands. This use has the potential to affect the overall condition of the roads. These roads must be maintained to ensure safe public access and the adequate protection of natural and environmental resources in the project area.

A Transportation Management Plan, as proposed by PG&E and specified by the resource agencies, would clarify the roles and responsibilities of the various stakeholders in road operation and maintenance. PG&E is responsible for the maintenance of all project roads within the project boundary (table 3-250). Under the plan, PG&E would be responsible for certain recreation roads, such as recreation access roads, primary campground circulation loops, and parking areas. Implementation of a Transportation Management Plan would assure that all project roads are maintained to current, applicable standards, would improve access to the project, and would minimize the potential for adverse environmental effects due to roads and road use.

A separate agreement between PG&E and the Forest Service resolves certain issues and responsibilities for roads that are outside the project boundary. The agreement addresses shared road (non-project) management responsibilities and funding (PG&E, 2011a).

Fire Prevention and Response Plan—Continued project operations and ongoing operations and maintenance of existing facilities (e.g., transmission lines, generators, and construction equipment), and increased recreational use over the term of a new license may contribute to fire danger in the project area. Fires in the project area may, among other things,

affect public safety, property, aesthetics, and air quality. The threat of and potential damage from wildfires in the project area would remain an issue under a new project license.

PG&E filed a Fire Prevention and Response Plan on Federal Land on April 12, 2011. PG&E proposes to implement the plan, as approved by the Commission, within 1 year of license issuance. The plan addresses fire prevention, protection, response, reporting, and investigation at project facilities on federal lands within the project boundary.

Forest Service 4(e) condition 45 specifies that, within 1 year of license issuance, PG&E complete, in consultation with the Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by the Forest Service, a Fire and Fuels Management Plan. The plan would address PG&E's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations. Upon Commission approval, PG&E would implement the plan. BLM 4(e) condition 18 is similar in that it specifies the completion of a Fire and Fuels Management Plan in consultation with Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by BLM. Under 10(a), California Fish and Wildlife recommends as condition 21 the completion of a Fire and Fuels Management Plan.

As an alternative to Forest Service 4(e) condition 45 and BLM 4(e) condition 18, PG&E proposes to implement the Fires Management and Response Plan filed with the Commission on April 12, 2011.

Our Analysis—The development and implementation of a Fire and Fuels Management Plan in consultation with the Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by the Forest Service and BLM, that incorporates the measures proposed by PG&E and specified by the Forest Service and BLM would improve planning, management, and coordination of wildfire protection and prevention measures. Additionally, the implementation of the plan would lead to a reduction in the occurrence and suppression of wildfires in the project area, minimizing damage to natural resources and other potential effects. The geographic scope of PG&E's plan excludes non-federal lands within the project boundary, which are also susceptible to fire danger. Additionally, there is no discussion of a period of review and revision of the plan. The plan includes certain information, such as key personnel and contact information that may need to be updated on a regular basis.

Hazardous Substance Management Plan—Forest Service 4(e) condition 23 specifies that, within 1 year of license issuance or prior to undertaking activities on NFS lands, PG&E file a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup. The plan would be developed in consultation with the State Water Board, California Fish and Wildlife, and the Regional Water Quality Control Board and would require PG&E to maintain suitable spill cleanup equipment in the project area; to inform the Forest Service of the location, type, and quantity of oil and hazardous substances stored in the project area; and to inform the Forest Service immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan would also include a monitoring plan that details corrective actions if a spill occurs and reporting requirements. BLM 4(e) condition 49 is identical to Forest Service 4(e) condition 23 except BLM's condition requires BLM approval of the plan.

Reclamation 4(e) condition b.10 specifies that PG&E not allow contamination or pollution of federal lands, waters, or facilities and that PG&E take reasonable precautions to prevent such contamination or pollution by third parties. Substances causing contamination or pollution include, but are not limited to, hazardous materials, thermal pollution, refuse, garbage,

sewage effluent, industrial waste, petroleum products, mine tailings, mineral salts, misused pesticides, pesticide containers, or any other pollutants.

As an alternative to Forest Service 4(e) condition 23, BLM 4(e) condition 49, and Reclamation 4(e) condition b.10, PG&E proposes to file a plan approved by the Forest Service and BLM for oil and hazardous substances storage and spill prevention and cleanup within 1 year of license issuance or prior to undertaking activities on federal lands. The plan would include the components required by the Forest Service and BLM conditions and would address the intent of the Reclamation condition, using a comprehensive plan approach.

Our Analysis—The potential exists for PG&E to spill hazardous substances within the project boundary and to impact area resources. PG&E is responsible for such spills and would be required to identify acceptable prevention and mitigation measures. The development and implementation of a Hazardous Substances Plan in consultation with the State Water Board, California Fish and Wildlife, and the Regional Water Quality Control Board and approved by the Forest Service and BLM would ensure that spills of hazardous substances are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects, including impacts to water quality.

Yuba-Bear Project

Changes to Existing Facilities and the Project Boundary—NID proposes the following changes to the existing project boundary:

- Use of contours as a partial replacement to survey metes and bounds around Jackson Meadows reservoir, Bowman reservoir, French Lake, Jackson Lake, Sawmill Lake, Faucherie Lake, Dutch Flat forebay, and Dutch Flat afterbay;
- Removal of the mineral survey area south of the Dutch Flat afterbay;
- Removal of the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it;
- Inclusion of the East Meadow Campground, Fir Top Campground, Bowman Lake Campground, and Canyon Creek Campground recreation sites; and
- Inclusion of certain primary project road segments, including a right-of-way of 20 feet on road centerline.

Land ownership within the Yuba-Bear existing and proposed project boundaries is summarized in table 3-255.

Table 3-255. Summary of land ownership within the existing and proposed Yuba-Bear Project boundary. (Source: NID, 2011a)

Owner	Existing Boundary		Proposed Boundary	
	Acres	% of Total	Acres	% of Total
Forest Service	1,540.8	25	1,435.5	24
BLM	208.5	3	231.1	4
NID	4,056.3	64	4,107.6	68
Other private	447.0	7	308.0	5
Total federal lands	1,749.3	28	1,666.6	28
Total non-federal lands	4,503.3	72	4,415.6	72
Total	6,252.6	100	6,082.2	100

Our Analysis—NID’s proposed changes to the project boundary would decrease the area within the project boundary by about 170 acres. The proposed project would continue to encompass lands owned by the United States and managed by the Forest Service and BLM. The areas proposed to be removed from the project boundary, which include the mineral survey area south of the Dutch Flat afterbay, and the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it, are not necessary for continued project operations. The proposed project boundary would encompass all facilities and features necessary for the operation of the project, including all primary project roads and existing, new, and/or rehabilitated recreation areas and recreation access roads. It is necessary that all primary project roads, including recreation access roads, and recreation areas be included in the licensed project boundary so the Commission has the authority to ensure that NID maintains adequate and safe public access to project lands and waters.

Transportation Management Plan—The roads used by NID to access project facilities are federal (Forest Service and BLM), state, county, and/or private roads.

NID filed a Transportation Management Plan on April 12, 2011, and a revised Transportation Management Plan on June 18, 2012, and August 29, 2012. NID proposes to implement the Transportation Management Plan, as approved by the Commission, within 1 year of license issuance. The plan describes the scope of road improvements needed for road design, construction, and maintenance including road planning, road rehabilitation, and road operation and maintenance for the primary project roads identified in table 3-251. Additionally, NID proposes to treat certain identified recreation roads with the same level of maintenance provided to primary project roads. Generally, recreation roads include recreation access roads, primary campground circulation loops, and parking areas. The plan includes an implementation schedule and discusses ongoing monitoring.

Forest Service 4(e) condition 44 specifies that, within 1 year of license issuance, NID file with the Commission a Road and Transportation Facility Management Plan, approved by the Forest Service, for the protection and maintenance of project and project-affected roads that are on or affect NFS lands. The Forest Service specifies that NID should consult with the Forest Service and other affected parties in the development of this plan. The Forest Service specifies that the plan should include identified project roads and recreation roads and should address:

planning and inventory; operation, maintenance, and road-associated debris; construction and reconstruction; and monitoring. NID should take appropriate measures to meet Forest Service and BLM maintenance level, traffic service level, and road management objectives. Upon Commission approval, NID should implement the plan.

BLM 4(e) condition 39 specifies that, within 1 year of license issuance, NID file with the Commission a Transportation Facility Management Plan, approved by BLM, for the protection and maintenance of project and project-affected roads that are on or affect BLM lands. BLM specifies that NID should consult with BLM and other affected parties in the development of this plan. BLM specifies that the plan should include identified project roads and should address: planning and inventory; operation, maintenance, and road-associated debris; construction and reconstruction; and monitoring. NID should take appropriate measures to meet BLM maintenance level, traffic service level, and road management objectives. Upon Commission approval, NID should implement the plan.

Generally consistent with Forest Service 4(e) condition 44, California Fish and Wildlife measure 20 recommends that, within 1 year of license issuance, NID file with the Commission a Road and Transportation Facility Management Plan, approved by the Forest Service and BLM, for the protection and maintenance of project and project-affected roads that are on or affect NFS or BLM lands.

As an alternative to Forest Service 4(e) condition 44 and BLM 4(e) condition 39, NID proposes to implement the Transportation Plan filed with the Commission on August 29, 2012.

Our Analysis—Roads in the project area are operated and maintained by different entities, including the Forest Service, BLM, the state, the counties, and/or private organizations. These roads are shared by many different users at varying use levels. The Forest Service and BLM use these roads to access federal lands and resources. NID uses many of these roads to access project facilities. Others, such as recreationalists, use these roads to access recreational facilities available at the project and on NFS lands. This use has the potential to affect the overall condition of the roads. These roads must be maintained to ensure safe public access and the adequate protection of natural and environmental resources in the project area.

A Transportation Management Plan, as proposed by NID and specified by the resource agencies, would clarify the roles and responsibilities of the various stakeholders in road operation and maintenance. NID is responsible for the maintenance of all project roads within the project boundary (table 3-251). Under the plan, NID would also be responsible for certain recreation roads, such as recreation access roads, primary campground circulation loops, and parking areas. Implementation of a Transportation Management Plan would ensure that all project roads are maintained to current, applicable standards, would improve access to the project, and would minimize the potential for adverse environmental effects due to roads and road use.

Fire Prevention and Response Plan—Continued project operations and existing facilities (e.g., transmission lines, generators, and construction equipment), and increased recreational use over the term of a new license may contribute to fire danger in the project area. Fires in the project area may, among other things, affect public safety, property, aesthetics, and air quality. The threat of and potential damage from wildfires in the project area would remain an issue under a new project license.

NID filed a Fire Prevention and Response Plan on Federal Land on April 12, 2011, and a revised Fire Prevention and Response Plan on June 18, 2012. NID proposes to implement the plan, as approved by the Commission, within 1 year of license issuance. The plan addresses fire

prevention, protection, response, reporting, and investigation at project facilities on federal lands within the project boundary.

Forest Service 4(e) condition 46 specifies that, within 1 year of license issuance, NID will complete, in consultation with the Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by the Forest Service, a Fire and Fuels Management Plan. The plan would address NID's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to project operations. Upon Commission approval, NID would implement the plan. BLM 4(e) condition 40 is similar in that it specifies the completion of a Fire and Fuels Management Plan in consultation with the Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by BLM. Under 10(a), California Fish and Wildlife recommends as condition 21 the completion of a Fire and Fuels Management Plan.

As an alternative to Forest Service 4(e) condition 46 and BLM 4(e) condition 40, NID proposes to implement the Fire Prevention and Response Plan filed with the Commission on June 18, 2012.

Our Analysis—The development and implementation of a Fire and Fuels Management Plan in consultation with the Forest Service, BLM, Cal Fire, potentially affected tribes, and other interested parties, and approved by the Forest Service and BLM, that incorporates the measures proposed by NID and specified by the Forest Service and BLM would improve planning, management, and coordination of wildfire protection and prevention measures. Additionally, the implementation of the plan would lead to a reduction in the occurrence and suppression of wildfires in the project area, minimizing damage to natural resources and other potential effects. However, the geographic scope of the plan should not be limited to only those project facilities on federal lands. The geographic scope of NID's plan excludes non-federal lands within the project boundary, which are also susceptible to fire danger. Additionally, there is no discussion of a period of review and revision of the plan. The plan includes certain information, such as key personnel and contact information that may need to be updated on a regular basis.

Hazardous Substance Management Plan—NID proposes to develop Hazardous Materials Spill Prevention, Control, and Countermeasure plans for the proposed Rollins upgrade construction and the construction of certain proposed new and/or rehabilitated recreation facilities. In each case, NID would provide the plan to the appropriate agencies for a 30-day review and comment period and would file the plan with the Commission at least 90 days in advance of initiating construction activities.

Forest Service 4(e) condition 23 specifies that, within 1 year of license issuance or prior to undertaking activities on NFS lands, NID file a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup. The plan would be developed in consultation with the State Water Board, California Fish and Wildlife, and the Regional Water Quality Control Board and would require NID to maintain suitable spill cleanup equipment in the project area; to inform the Forest Service of the location, type, and quantity of oil and hazardous substances stored in the project area; and to inform the Forest Service immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan would also include a monitoring plan that details corrective actions if a spill occurs and reporting requirements. Upon Commission approval, NID would implement the plan.

BLM 4(e) condition 51 specifies that NID identify and report all known or observed hazardous conditions on or directly affecting BLM lands within the project boundary.

Additionally, NID would abate these conditions, except those caused by third parties or not related to the occupancy and use of BLM lands. Any non-emergency actions to abate such hazardous conditions on BLM lands would be performed only after consultation with BLM.

Our Analysis—The potential exists for NID to spill hazardous substances within the project boundary and to impact area resources. NID is responsible for such spills and would be required to identify acceptable prevention and mitigation measures. NID proposes to develop Spill Prevention, Control, and Countermeasure plans specific to the proposed Rollins upgrades and new/rehabilitated recreation-related construction. The development of a single, comprehensive plan, in consultation with the State Water Board, California Fish and Wildlife, and the Regional Water Quality Control Board, and approved by the Forest Service and BLM to address spills within the project area during any project-related activity would better ensure that spills of hazardous substances are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects, including impacts to water quality.

Aesthetic Resources

Drum-Spaulding Project

Visual Resource Management Plan—PG&E filed a Visual Resource Management Plan on April 12, 2011, and a revised Visual Resource Management Plan on June 18, 2012. PG&E proposes to implement the plan, as approved by the Commission, within 1 year of license issuance. The goal of the plan is to improve the visual quality of the project by reducing the visual contrast of existing and proposed project facilities on federal lands administered by the Forest Service, BLM, and Reclamation. The plan includes an implementation schedule.

Forest Service 4(e) condition 42 specifies that PG&E finalize the Visual Resource Management Plan in consultation with the Forest Service. The plan would be submitted to the Forest Service for approval. PG&E would implement the plan upon Commission approval.

BLM 4(e) condition 20 specifies that PG&E finalize the Visual Resource Management Plan in consultation with the Forest Service and BLM. The plan would be submitted to the Forest Service and BLM for approval. PG&E would implement the plan upon Commission approval.

As an alternative to Forest Service 4(e) condition 42 and BLM 4(e) condition 20, PG&E proposes to implement the Visual Resource Management Plan filed with the Commission on June 18, 2012.

Our Analysis—Certain project facilities on federal lands do not meet current, applicable visual resource management objectives as defined by the Forest Service, BLM, and Reclamation. Silver penstocks, large dams, and powerhouses create visual contrast with the surrounding landscape. The plan identifies the project facilities that would be painted a darker color to reduce visual contrast and includes an implementation schedule. The plan also addresses consultation during implementation and reporting, and establishes a process to evaluate future activities at the project that may result in changes to the visual environment.

The implementation of the plan would reduce color contrast, make project facilities more consistent with established visual quality objectives, and improve overall visual quality in the project area. An annual coordination meeting would allow PG&E to work cooperatively with the Forest Service, BLM, and Reclamation to review the visual mitigation activities planned for the upcoming year, identify any revisions needed, and make any adjustments to the plan or schedule, as appropriate. Additionally, consultation with the Forest Service, BLM, and/or Reclamation, as

appropriate, on any new project facilities or enhancements to existing project facilities would ensure that the facilities are designed and constructed to be consistent with applicable visual quality objectives.

Yuba-Bear Project

NID filed a Visual Resource Management Plan on April 12, 2011, and a revised Visual Resource Management Plan on June 18, 2012. NID proposes to implement the plan, as approved by the Commission, within 1 year of license issuance. The goal of the plan is to reduce the visual contrast of existing and proposed project facilities on federal lands administered by the Forest Service and BLM. The plan includes an implementation schedule.

Forest Service 4(e) condition 42 specifies that NID finalize the Visual Resource Management Plan in consultation with the Forest Service. The plan would be submitted to the Forest Service for approval. NID would implement the plan upon Commission approval.

Under 10(a), California Fish and Wildlife recommends as condition 18 the finalization of a Visual Resource Management Plan, in consultation with the Forest Service and BLM, to be submitted to the Forest Service and BLM for approval. NID would implement the plan upon Commission approval.

As an alternative to Forest Service 4(e) condition 42 and California Fish and Wildlife condition 18, NID proposes to implement the Visual Resources Management Plan filed with the Commission on June 18, 2012.

Our Analysis—Certain project facilities on federal lands do not meet current, applicable visual resource management objectives as defined by the Forest Service and BLM. Project buildings, fences, guard rails, and spoil piles create visual contrast with the surrounding landscape. The plan identifies the project facilities that would be painted a darker color and the spoil piles that would be removed to reduce visual contrast and includes an implementation schedule. The plan also addresses consultation during implementation and reporting, and establishes a process to evaluate future activities at the project that may result in changes to the visual environment.

The implementation of the plan would make project facilities more consistent with established visual quality objectives and would improve overall visual quality in the project area. An annual coordination meeting would allow NID to work cooperatively with the Forest Service and BLM to review the visual mitigation activities planned for the upcoming year, identify any revisions needed, and make any adjustments to the plan or schedule, as appropriate. Additionally, consultation with the Forest Service and BLM, as appropriate, on any new project facilities or enhancements to existing project facilities would ensure that the facilities are designed and constructed to be consistent with applicable visual quality objectives.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we analyze the economic power benefits of the Drum-Spaulding and Yuba-Bear Projects, and we estimate the annual cost of the projects, including costs for any construction, operation, maintenance, and environmental measures. We use this cost information in the *Comprehensive Development and Recommended Alternative* sections (section 5.1.2 for the Drum-Spaulding Project; section 5.2.2 for the Yuba-Bear Project) to support our recommendation for which alternative to recommend and which measures to include in each project's license.

Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corporation (Corp)*,¹ the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

4.1 DRUM-SPAULDING PROJECT

In this section, we look at the Drum-Spaulding Project's use of the Yuba and Bear Rivers for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Because PG&E requested that the Commission approve a separate license for the existing Deer Creek Development (currently part of the Drum-Spaulding Project), we have performed a separate economic analysis of the Deer Creek Project. The project costs, benefits, and proposed protection, mitigation, and enhancement measures are discussed separately from the Drum-Spaulding Project, in section 4.2.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EIS for the protection, mitigation, and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost; and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power.

4.1.1 Power and Developmental Benefits of the Drum-Spaulding Project

Table 4-1 summarizes the assumptions and economic information we use in our analysis. This information was provided by PG&E in its license application. We find that the values provided by PG&E are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal O&M cost; and Commission fees.

¹ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

Table 4-1. Parameters for economic analysis of the Drum-Spaulding Project. (Source: PG&E and staff)

Assumption	Value
Period of analysis (years)	30
Term of financing (years)	20
Federal and state tax rate	40.75%
Insurance rate	1.2%
Base year for costs and benefits	2011
Total original net investment (\$2011) ^a	\$157,599,000
Total relicensing cost (\$2011) ^a	\$44,000,000
Future major capital cost (\$2011) ^a	\$17,500,000
Operation and Maintenance, including insurance (\$2011/year) ^a	\$14,503,000
Commission Fees (\$2011/year) ^a	\$599,000
Property Taxes (\$2011/year) ^b	\$903,000
Peak/Off-peak energy value (mills/kWh) ^c	95.0
Dependable capacity value (\$/kW-yr) ^c	0
Interest rate	8.79%
Discount rate	8.79%

^a PG&E (2011a) Supplement No. 3 to PG&E's License Application, as Amended, Table 3.0-1.

^b PG&E (2011a) Amended Exhibit D, Statement of Project Costs and Financing, Page D-4, Section 4.2.

^c Based on Exhibit H of the application, we assumed the power value, along with the State's Renewable Portfolio Standards (RPS) credit accounts for the capacity value.

4.1.2 Comparison of Drum-Spaulding Alternatives

Table 4-2 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EIS: no action, PG&E's proposal, the staff alternative, and the staff alternative with mandatory conditions.

Table 4-2. Summary of the annual cost of alternative power and annual project cost for four alternatives for the Drum-Spaulding Project. (Source: staff)

	No Action	PG&E's Proposal	Staff Alternative	Staff Alternative With Mandatory Conditions
Installed capacity (MW)	192.5	185.8	185.8	185.8
Annual generation (MWh) ^a	727,000	653,000	653,000	653,000
Dependable capacity (MW)	136.4	136	136	136
Annual power value (\$)	\$69,065,000	\$62,035,000	\$62,035,000	\$62,035,000
Annual power value (\$/MWh)	\$95.0	\$95.0	\$95.0	\$95.0
Annualized cost of plant and current environmental measures (\$)	\$61,371,000	\$61,371,000	\$61,371,000	\$61,371,000
Annualized cost of new environmental measures (including energy losses contained in the power values above) (\$)	\$0	\$14,536,000	\$17,118,000	\$18,343,000
Annualized cost of new environmental measures (excluding energy losses contained in the power values above) (\$)	\$0	\$7,506,000	\$10,088,000	\$11,313,000
Annual cost (\$)	\$61,371,000	\$68,877,000	\$71,459,000	\$72,684,000
Annual cost (\$/MWh)	\$84.42	\$105.48	\$109.43	\$111.31
Annual net benefit (\$)	\$7,694,000	(\$6,842,000) ^b	(\$9,424,000) ^b	(\$10,649,000) ^b
Annual net benefit (\$/MWh)	\$10.58	(\$10.48) ^b	(\$14.43) ^b	(\$16.31) ^b

^a The annual generation for the no-action alternative is based upon power generation calculated using average 2001-2009 water supply deliveries. The annual generation for PG&E's proposal is based upon power generation calculated using existing (2001-2009) water deliveries as well.

^b A number in parentheses denotes that the difference between the cost of alternative power and project cost is negative; thus, the total project cost is greater than the cost of alternative power.

4.1.2.1 No-Action Alternative

PG&E provided an estimate of average annual output of the project under the no-action alternative (current conditions) of 727 GWh, which would provide annual power benefits of \$69,065,000. Subtracting the current costs of \$61,371,000 yields an annual net benefit of \$7,694,000.

4.1.2.2 PG&E's Proposal

The measures that PG&E proposes, summarized in table 4-3, increase the annualized costs from \$61,371,000 to \$68,877,000 relative to the no-action alternative. PG&E proposes some operational changes which would reduce annual generation by 74 GWh, resulting in annual power benefits of \$62,035,000 and an annual net loss of \$6,842,000. This equals an overall reduction in annual net benefits of \$14,536,000 relative to the no-action alternative. The decrease in net benefit from \$10.58/MWh under the no-action alternative to a net loss of \$10.48/MWh for the proposed action represents a total decrease in net benefits of \$21.06/MWh.

4.1.2.3 Staff Alternative

The measures included in the staff alternative, summarized in table 4-3, would increase annualized costs from \$61,371,000 to \$71,459,000 relative to the no-action alternative. Operational changes would reduce annual generation from 727,000 MWh to 653,000 MWh. The staff alternative would provide annual power benefits of \$62,035,000 and an annual net loss of \$9,424,000. This represents an overall reduction in annual net benefits of \$17,118,000 relative to the no-action alternative. Therefore, the staff alternative would further decrease the net benefits of the project by \$3.95/MWh compared to the proposed project.

4.1.2.4 Staff Alternative With Mandatory Conditions

The measures included in the staff alternative with mandatory conditions, summarized in table 4-3, would increase annualized costs from \$61,371,000 to \$72,684,000 relative to the no-action alternative. Operational changes would reduce annual generation from 727,000 MWh to 653,000 MWh. The staff alternative with mandatory conditions would provide annual power benefits of \$62,035,000 and an annual net loss of \$10,649,000. Therefore, the added cost of the mandatory measures would further reduce the net benefits of the project by \$1.88/MWh compared to the staff alternative.

4.1.3 Cost of Drum-Spaulding Environmental Measures

Table 4-3 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost. Costs are taken from the final license application filed in 2011 and Supplement No. 3 to PG&E's License Application, as amended (PG&E, 2011a). Table 4-3 summarizes the capital and O&M costs by major resource area for the Drum-Spaulding Project. Changes in power benefits are addressed in section 4.1.2.

Appendix D-1 includes capital and O&M costs for individual measures proposed by PG&E and included in terms, conditions, and recommendations received from agencies and other interested parties.

Table 4-3. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Drum-Spaulding Project.^a (Source: PG&E and staff)

Resource Area	PG&E's Proposed Action			Staff Alternative			Staff Alternative With Mandatory Conditions		
	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (excluding energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)
General	\$11,000	\$100,000	\$111,000	\$11,000	\$100,000	\$111,000	\$11,000	\$100,000	\$111,000
Geology and Soils	\$0	\$0	\$0	\$380,000	\$19,000	\$399,000	\$380,000	\$19,000	\$399,000
Aquatic resources	\$3,108,000	\$420,000	\$3,528,000	\$3,398,000	\$1,060,000	\$4,458,000	\$3,614,000	\$1,815,000	\$5,429,000
Terrestrial resources	\$325,000	\$87,000	\$412,000	\$679,000	\$271,000	\$950,000	\$926,000	\$261,000	\$1,187,000
Recreation resources	\$883,000	\$1,042,000	\$1,925,000	\$1,021,000	\$1,302,000	\$2,323,000	\$1,033,000	\$1,307,000	\$2,340,000
Cultural resources	\$902,000	\$61,000	\$963,000	\$902,000	\$122,000	\$1,024,000	\$902,000	\$122,000	\$1,024,000
Land use and aesthetic resources	\$297,000	\$270,000	\$567,000	\$438,000	\$385,000	\$823,000	\$438,000	\$385,000	\$823,000
Total	\$5,526,000	\$1,980,000	\$7,506,000	\$6,829,000	\$3,259,000	\$10,088,000	\$7,304,000	\$4,009,000	\$11,313,000

^a This summary does not include mitigation measures that are directly associated with the Deer Creek Project.

4.2 DEER CREEK PROJECT

4.2.1 Power and Developmental Benefits of the Deer Creek Project

Because PG&E requested that the Commission approve a separate license for the existing Deer Creek Development, we have performed a separate economic analysis of the development.

Table 4-4 summarizes the assumptions and economic information we use in our analysis. This information was provided by PG&E in its license application. We find that the values provided by PG&E are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal O&M cost; and Commission fees.

Table 4-4. Parameters for economic analysis of the Deer Creek Project. (Source: PG&E and staff)

Assumption	Value
Period of analysis (years)	30
Term of financing (years)	20
Federal and state tax rate	40.75%
Insurance rate	1.2%
Base year for costs and benefits	2011
Total original net investment (\$2011) ^a	\$13,806,000
Total relicensing cost (\$2011) ^a	\$3,843,000
Future major capital cost (\$2011r) ^a	\$1,000,000
Operation and Maintenance, including insurance (\$2011/year) ^a	\$1,400,000
Commission Fees (\$2011/year) ^a	\$14,000
Peak/Off-peak energy value (mills/kWh)	95.0
Dependable capacity value (\$/kW-yr) ^b	0
Interest rate	8.79%
Discount rate	8.79%

^a PG&E (2011a) Supplement No. 3 to PG&E's License Application, as Amended, Page 10, Table 4.2-2.

^b Based on Exhibit H of the application, we assumed the power value, along with the State's RPS credit accounts for the capacity value.

4.2.2 Comparison of Deer Creek Alternatives

Table 4-5 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for

each of the alternatives considered in this EIS: no action, PG&E's proposal, the staff alternative, and the staff alternative with mandatory conditions.

Table 4-5. Summary of the annual cost of alternative power and annual project cost for four alternatives for the Deer Creek Project. (Source: staff)

	No Action	PG&E's Proposal	Staff Alternative	Staff Alternative With Mandatory Conditions
Installed capacity (MW)	5.7	5.7	5.7	5.7
Annual generation (MWh)	22,600	22,400	22,400	22,400
Dependable capacity (MW)	3.4	3.4	3.4	3.4
Annual power value (\$)	\$2,147,000	\$2,128,000	\$2,128,000	\$2,128,000
Annual power value (\$/MWh)	\$95.0	\$95.0	\$95.0	\$95.0
Annualized cost of plant and current environmental measures (\$)	\$5,276,000	\$5,276,000	\$5,276,000	\$5,276,000
Annualized cost of new environmental measures (including energy losses contained in the power values above) (\$)	\$0	\$515,000	\$516,000	\$517,000
Annualized cost of new environmental measures (excluding energy losses contained in the power values above) (\$)	\$0	\$496,000	\$497,000	\$498,000
Annual cost (\$)	\$5,276,000	\$5,772,000	\$5,773,000	\$5,774,000
Annual cost (\$/MWh)	\$233.43	\$257.68	\$257.72	\$257.77
Annual net benefit (\$)	(\$3,129,000) ^b	(\$3,644,000) ^b	(\$3,645,000) ^b	(\$3,646,000) ^b
Annual net benefit (\$/MWh)	(\$138.43) ^b	(\$162.68) ^b	(\$162.72) ^b	(\$162.77) ^b

^a The annual generation for the no-action alternative is based upon power generation calculated using average 2001-2009 water supply deliveries. The annual generation for PG&E's proposal is based upon power generation calculated using existing water deliveries.

^a A number in parentheses denotes that the difference between the cost of alternative power and project cost is negative; thus, the total project cost is greater than the cost of alternative power.

4.2.2.1 No-Action Alternative

PG&E provided an estimate of average annual output of the project under the no-action alternative (current conditions) of 22.6 GWh, which would provide annual power benefits of \$2,147,000. Subtracting the current costs of \$5,276,000 yields an annual net loss of \$3,129,000.

4.2.2.2 PG&E's Proposal

The measures that PG&E proposes, summarized in table 4-6, increase the annualized costs from \$5,276,000 to \$5,772,000 relative to the no-action alternative. PG&E proposes some operational changes which would reduce annual generation by 0.2 GWh, resulting in annual power benefits of \$2,128,000 and an annual net loss of \$3,644,000. This equals an overall reduction in annual net benefits of \$515,000 relative to the no-action alternative. The increase in net loss from \$138.43/MWh under the no-action alternative to a net loss of \$162.68/MWh for the proposed action represents a total decrease in net benefits of \$24.25/MWh.

4.2.2.3 Staff Alternative

The measures included in the staff alternative, summarized in table 4-6, would increase annualized costs from \$5,276,000 to \$5,773,000 relative to the no-action alternative. Operational changes would reduce annual generation from 22,600 MWh to 22,400 MWh. The staff alternative would provide annual power benefits of \$2,128,000 and an annual net loss of \$3,645,000. This represents an overall reduction in annual net benefits of \$516,000 relative to the no-action alternative. Therefore, the staff alternative would further decrease the net benefits of the project by \$0.04/MWh compared to the proposed project.

4.2.2.4 Staff Alternative With Mandatory Conditions

The measures included in the staff alternative with mandatory conditions, summarized in table 4-6, would increase annualized costs from \$5,276,000 to \$5,774,000 relative to the no-action alternative. Operational changes would reduce annual generation from 22,600 MWh to 22,400 MWh. The staff alternative with mandatory conditions would provide annual power benefits of \$2,128,000 and an annual net loss of \$3,646,000. This represents an overall reduction in annual net benefits of \$517,000 relative to the no-action alternative. Therefore, the added cost of the mandatory measures would further reduce the net benefits of the project by \$0.05/MWh compared to the staff alternative.

4.2.3 Cost of Deer Creek Environmental Measures

Table 4-6 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost. Costs are taken from the final license application filed in 2011 and Supplement No. 3 to PG&E's License Application, as Amended (PG&E, 2011a). Table 4-6 summarizes the capital and O&M costs by major resource area for the Deer Creek Project. Changes in power benefits are addressed in section 4.2.2.

Appendix D-2 includes capital and O&M costs for individual measures proposed by PG&E and included in terms, conditions, and recommendations received from agencies and other interested parties.

Table 4-6. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Deer Creek Project.^a (Source: PG&E and staff)

Resource Area	PG&E's Proposed Action			Staff Alternative			Staff Alternative With Mandatory Conditions		
	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (excluding energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)
General	\$0	\$8,000	\$8,000	\$0	\$8,000	\$8,000	\$0	\$8,000	\$8,000
Aquatic resources	\$0	\$25,000	\$25,000	\$0	\$25,000	\$25,000	\$0	\$25,000	\$25,000
Terrestrial resources	\$10,000	\$18,000	\$28,000	\$10,000	\$17,000	\$27,000	\$10,000	\$18,000	\$28,000
Recreation resources	\$0	\$4,000	\$4,000	\$0	\$4,000	\$4,000	\$0	\$4,000	\$4,000
Cultural resources	\$156,000	\$29,000	\$185,000	\$156,000	\$29,000	\$185,000	\$156,000	\$29,000	\$185,000
Land use and aesthetic resources	\$129,000	\$117,000	\$246,000	\$129,000	\$119,000	\$248,000	\$129,000	\$119,000	\$248,000
Total	\$295,000	\$201,000	\$496,000	\$295,000	\$202,000	\$497,000	\$295,000	\$203,000	\$498,000

^a This summary does not include mitigation measures that are directly associated with the Drum-Spaulding Project.

4.3 YUBA-BEAR PROJECT

In this section, we look at the Yuba-Bear Project's use of the Yuba and Bear Rivers for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. As part of its Amended Application, NID proposes to construct the Rollins no. 2 powerhouse adjacent to the existing Rollins powerhouse. The estimated construction cost of this project is about \$22 million (2010 dollars). Although the proposed powerhouse is included in NID's proposal, we have analyzed the costs and benefits of this project separately, so that the feasibility of the powerhouse construction project can be more accurately assessed. The project costs, benefits, and proposed environmental measures associated with the Rollins no. 2 powerhouse are discussed separately in section 4.3.4.

4.3.1 Power and Developmental Benefits of the Yuba-Bear Project

Table 4-7 summarizes the assumptions and economic information we use in our analysis. This information was provided by NID in its license application. We find that the values provided by NID are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal O&M cost; and Commission fees.

Table 4-7. Parameters for economic analysis of the Yuba-Bear Project. (Source: NID and staff)

Assumption	Value
Period of analysis (years)	30
Term of financing (years)	20
Insurance rate	0%
Base year for costs and benefits	2010
Total original net investment ^a (\$2010)	\$20,413,000
Total relicensing cost ^b (\$2010)	\$11,000,000
Federal, state, and local annual taxes (\$2010/year) ^c	\$500,000
Annual depreciation expense (\$2010/year) ^c	\$2,500,000
Operation and Maintenance (\$2010/year) ^c	\$2,487,000
Commission Fees (\$2010/year) ^c	\$367,000
Transmission Costs (\$2010/year) ^c	\$300,000
Operating Reserve (\$2010/year) ^c	\$600,000
Power Purchase Contract Management (\$2010/year) ^c	\$40,000
Peak/Off-peak energy value (mills/kWh)	76.0
Dependable capacity value (\$/kW-yr) ^d	0
Interest rate	5.0%

Table 4-7. Parameters for economic analysis of the Yuba-Bear Project. (Source: NID and staff)

Discount rate	5.0%
^a NID (2011a) Supplement No. 1 to NID's License Application, as Amended, Page 5, Table 3.1-1.	
^b NID (2011a) Supplement No. 2 to NID's License Application, as Amended, Section 3.1.8	
^c NID (2011a) Supplement No. 2 to NID's License Application, as Amended, Page 5, Table 3.1-1.	
^d Based on exhibit H of the application, we assumed that the power value, along with the State's RPS credit accounts for the capacity value.	

4.3.2 Comparison of Yuba-Bear Alternatives

Table 4-8 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EIS: no-action, NID's proposal, the staff alternative, and the staff alternative with mandatory conditions.

Table 4-8. Summary of the annual cost of alternative power and annual project cost for four alternatives for the Yuba-Bear Project. (Source: staff)

	No Action	NID's Proposal	Staff Alternative	Staff Alternative With Mandatory Conditions
Installed capacity (MW)	79.3	79.3	79.3	79.3
Annual generation (MWh) ^a	266,000	236,000	236,000	236,000
Dependable capacity (MW)	47	45	45	45
Annual power value (\$)	\$20,216,000	\$17,936,000	\$17,936,000	\$17,936,000
Annual power value (\$/MWh)	\$76.0	\$76.0	\$76.0	\$76.0
Annualized cost of plant and current environmental measures (\$)	\$8,471,000	\$8,471,000	\$8,471,000	\$8,471,000
Annualized cost of new environmental measures (including energy losses contained in the power values above) (\$)	\$0	\$6,118,000	\$7,225,000	\$7,497,000

Table 4-8. Summary of the annual cost of alternative power and annual project cost for four alternatives for the Yuba-Bear Project. (Source: staff)

	No Action	NID's Proposal	Staff Alternative	Staff Alternative With Mandatory Conditions
Annualized cost of new environmental measures (excluding energy losses contained in the power values above) (\$)	\$0	\$3,838,000	\$4,945,000	\$5,217,000
Annual cost (\$)	\$8,471,000	\$12,309,000	\$13,416,000	\$13,688,000
Annual cost (\$/MWh)	\$31.84	\$52.16	\$56.85	\$58.00
Annual net benefit (\$)	\$11,745,000	\$5,627,000	\$4,520,000	\$4,248,000
Annual net benefit (\$/MWh)	\$44.16	\$23.84	\$19.15	\$18.00

^a The annual generation for the no-action alternative is based upon power generation calculated using average 2001-2009 water supply deliveries. The annual generation for NID's proposal is based upon power generation calculated using existing water deliveries, and not including construction of the proposed Rollins no. 2 powerhouse.

4.3.2.1 No-Action Alternative

NID provided an estimate of average annual output of the project under the no-action alternative (current conditions) of 266 GWh, which would provide annual power benefits of \$20,216,000. Subtracting the current costs of \$8,471,000 yields an annual net benefit of \$11,745,000.

4.3.2.2 NID's Proposal

The measures that NID proposes, summarized in table 4-9, increase the annualized costs from \$8,471,000 to \$12,309,000 relative to the no-action alternative. NID proposes some operational changes which would reduce annual generation by 30.0 GWh, resulting in annual power benefits of \$17,936,000 and an annual net benefit of \$5,627,000. This equals an overall reduction in annual net benefits of \$6,118,000 relative to the no-action alternative. The decrease in net benefits from \$44.16/MWh under the no-action alternative to \$23.84/MWh for the proposed action represents a total decrease in net benefits of \$20.32/MWh.

4.3.2.3 Staff Alternative

The measures included in the staff alternative, summarized in table 4-9, would increase annualized costs from \$8,471,000 to \$13,416,000 relative to the no-action alternative. Operational changes would reduce annual generation from 266,000 MWh to 236,000MWh. The staff alternative would provide annual power benefits of \$17,936,000 and an annual net benefit of \$4,520,000. This represents an overall reduction in annual net benefits of \$7,225,000 relative to the no-action alternative.

Therefore, the staff alternative would further decrease the net benefits of the project by \$4.69/MWh compared to the proposed project.

4.3.2.4 Staff Alternative With Mandatory Conditions

The measures included in the staff alternative with mandatory conditions, summarized in table 4-9, would increase annualized costs from \$8,471,000 to \$13,688,000 relative to the no-action alternative. Operational changes would reduce annual generation from 266,000 MWh to 236,000 MWh. The staff alternative with mandatory conditions would provide annual power benefits of \$17,936,000 and an annual net benefit of \$4,248,000. This represents an overall reduction in annual net benefits of \$7,497,000 relative to the no-action alternative. Therefore, the added cost of the mandatory measures would further reduce the net benefits of the project by \$1.15/MWh compared to the staff alternative.

4.3.3 Cost of Yuba-Bear Environmental Measures

Table 4-9 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost. Costs are taken from the final license application filed in 2011 and Supplement No. 2 to NID's License Application, as Amended (NID, 2011a). Table 4-9 summarizes the capital and O&M costs by major resource area for the Yuba-Bear Project.

Proposed environmental measures that are directly associated with the proposed Rollins no. 2 powerhouse are not included in table 4-9. The capital and O&M costs by major resource area associated with the construction of the proposed Rollins no. 2 powerhouse are included separately in table 4-10.

Appendix E includes capital and O&M costs for individual measures proposed by NID and included in terms, conditions, and recommendations received from agencies and other interested parties.

Table 4-9. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Yuba-Bear Project.^a (Source: NID and staff)

Resource Area	NID's Proposed Action			Staff Alternative			Staff Alternative With Mandatory Conditions		
	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (excluding energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)
General	\$4,000	\$59,000	\$63,000	\$4,000	\$56,000	\$60,000	\$4,000	\$56,000	\$60,000
Geology and soils	\$193,000	\$25,000	\$218,000	\$359,000	\$210,000	\$569,000	\$359,000	\$210,000	\$569,000
Water resources	\$4,000	\$0	\$4,000	\$4,000	\$0	\$4,000	\$4,000	\$0	\$4,000
Aquatic resources	\$173,000	\$225,000	\$398,000	\$283,000	\$562,000	\$845,000	\$301,000	\$767,000	\$1,068,000
Terrestrial resources	\$17,000	\$90,000	\$107,000	\$19,000	\$110,000	\$129,000	\$19,000	\$125,000	\$144,000
Recreation resources	\$2,009,000	\$772,000	\$2,781,000	\$2,046,000	\$1,019,000	\$3,065,000	\$2,064,000	\$1,035,000	\$3,099,000
Cultural resources	\$102,000	\$14,000	\$116,000	\$102,000	\$14,000	\$116,000	\$102,000	\$14,000	\$116,000
Land use and aesthetic resources	\$54,000	\$97,000	\$151,000	\$60,000	\$97,000	\$157,000	\$60,000	\$97,000	\$157,000
Total	\$2,556,000	\$1,282,000	\$3,838,000	\$2,877,000	\$2,068,000	\$4,945,000	\$2,913,000	\$2,304,000	\$5,217,000

Table 4-10. Summary of annualized costs by resource area for measures included in the proposed action and proposed action with staff modifications for the Yuba-Bear Project. This summary includes only measures that are directly associated with construction of the proposed Rollins no. 2 powerhouse. (Source: staff)

Resource Area	NID's Proposed Action			Staff Alternative			Staff Alternative With Mandatory Conditions		
	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (excluding energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)	Annualized Capital Cost	Annualized O&M Cost	Total Annualized Cost (including energy)
General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Geology and soils	\$2,000	\$0	\$2,000	\$2,000	\$0	\$2,000	\$2,000	\$0	\$2,000
Water resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Aquatic resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Terrestrial resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Recreation resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cultural resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Land use and aesthetic resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$2,000	\$0	\$2,000	\$2,000	\$0	\$2,000	\$2,000	\$0	\$2,000

4.3.4 Comparison of Alternatives for NID's Proposed Rollins No. 2 Powerhouse

To develop the hydro potential of higher instream releases that may be required in any new license, NID proposes to install a new unit at the Rollins powerhouse below Rollins dam on the Bear River. NID estimates an 11.4-MW powerhouse would produce 17 GWh of annual generation and would have a one-time capital cost of \$21,986,000. We estimate that additional annual costs, including operation and maintenance, taxes, fees, operating reserve, insurance, and transmission costs amount to \$221,000. In table 4-11, we present our estimate of the power value, annual costs, and net benefits of the proposed Rollins no. 2 powerhouse.

Table 4-11. Summary of annual net benefits and costs for the proposed Rollins no. 2 powerhouse of the Yuba-Bear Project. (Source: staff)

	Rollins no. 2 11.4 MW
Total original net investment (\$2010) ^a	\$21,986,000
Operation and Maintenance (\$2010/year) ^a	\$175,000
Annual taxes, fees, etc. (\$2010/year) ^a	\$46,000
Annualized cost of plant and environmental measures (\$)	\$2,000
Annual power value (\$2010)	\$1,292,000
Annual power value (\$2010/MWh)	\$76.0
Total Annual cost (\$)	\$1,653,000
Total Annual cost (\$/MWh)	\$97.13
Annual net benefit (\$)	(\$361,000)
Annual net benefit (\$/MWh)	(\$21.13)

^a NID (2011a) Supplement No. 1 to NID's License Application, as Amended, Page 9, Table 4.1-2.

As table 4-11 shows, the Rollins no. 2 powerhouse that NID is considering would have initial annual costs that exceed the current power value. Although Commission staff does not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve. NID must also consider whether this hydro proposal would qualify as part of its state requirement to develop renewable resources. Based on the Commission's policy under the Mead decision, it is the applicant who must decide whether to accept any license and the financial risk that entails.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 DRUM-SPAULDING PROJECT

5.1.1 Comparison of Proposed Project and Alternatives

In this section, we compare the developmental and non-developmental effects of PG&E's proposal, PG&E's proposal as modified by staff (staff alternative), and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the generation would be 675,400 MWh for the proposed action; 675,400 MWh for the staff alternative; and 749,600 MWh for the no-action alternative.

We summarize the environmental effects of the different alternatives in table 5-1.

Table 5-1. Comparison of alternatives for the Drum-Spaulling Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Generation	749.6 GWh	675.4 GWh	675.4 GWh
Geology and Soils	Project-related erosion and sedimentation occurring on project lands or waters resulting from project operation would continue to occur.	Implementation of an Erosion Control and Slope Maintenance Plan would minimize short- and long-term erosion and sedimentation resulting from project operation and proposed project construction.	Same as proposed action.
Aquatic Resources	Existing minimum streamflows do not vary with type of water year, creating restricted seasonal and interannual flow variability typical of regulated streams with limited aquatic habitat and fish production.	Water Year Type - Minimum instream flow requirements dependent on six different water year types: extremely critically dry; critically dry; dry; below normal; above normal; and wet.	Same as proposed action with the modification that extreme critically dry water year type flows be implemented in the second year of two sequential critically dry years.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Provide existing minimum streamflows in 16 stream reaches; 12 project-affected stream reaches would continue to have no required minimum streamflow providing no aquatic habitat. Three additional stream reaches would have minimum streamflows by other agreements with California Fish and Wildlife and/or the Forest Service.	Minimum Streamflows – Provide same or higher minimum streamflows depending on water year in 18 project-affected reaches; new minimum streamflows in 12 project-affected reaches with no existing minimum streamflows; and no minimum streamflow at 1 previous compliance point. The higher streamflows would increase fish habitat for all resident fish species.	Same as proposed action.
	Fish would continue to be lost due to canal dewatering and reduction of minimum flows would adversely affect downstream aquatic habitat.	Canal Outages - Notify licensing participants of all annual planned and non-routine planned canal outages; provide required minimum instream flow or inflow whichever is less. For canal outages expected to extend past 30 days consult with agencies and notify the Commission of any modifications to minimum streamflows agreed on for the outage period; notify agencies within one business day in event of emergency outage: Drum and Bear River canals would not be taken out of service at the same time.	Same as proposed action.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	<p>Diversion of water released from Rollins dam at Bear River canal diversion dam has potential to result in non-compliance with Bear River minimum flow requirement at downstream gage YB-196, with the potential for reducing aquatic habitat.</p>	<p>Coordinate Operations of Drum-Spaulding (Halsey Development) and Yuba-Bear (Rollins Development) to maintain minimum instream flows in the Bear River below Rollins dam by not diverting excessive water to the Bear River canal.</p>	<p>Same as proposed action.</p>
	<p>Fordyce Lake operated to retain meltwater for release later in summer, reducing stream flow and aquatic habitat in spring and early summer.</p>	<p>Fordyce Lake Drawdown to increase minimum streamflows in Fordyce Creek – Manage discharge from Fordyce Lake after spills cease at Fordyce Lake and Lake Spaulding. The high target flow (475-250 cfs) from Fordyce Lake should not cause additional spill from Lake Spaulding. End of year carryover storage at Fordyce Lake would be 7,500 to 10,000 acre-feet. Releases would be apportioned between 29,000 and 10,000 acre-feet. A 10-day special event flow of 50 cfs would begin in the third week of August.</p>	<p>Same as proposed action.</p>

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	No continuous minimum streamflow released at Drum canal spill gate, reducing aquatic habitat.	Minimum Streamflow Releases to Bear River below Drum canal as measured at gage YB-137 – Construction and operation of two flow release devices near Drum canal spillway, releasing 1 cfs in extremely critically dry and critically dry water years and 2 cfs in all other water years, would minimize effects to aquatic habitat.	Same as proposed action.
	Flows decline rapidly once spill terminates; water depth in downstream reach decreases rapidly with the potential for stranding aquatic organisms.	Spill Cessation and Minimization of Flow Fluctuations in South Yuba River – Implementation of a spill cessation schedule at Lake Spaulding to minimize rapid flow reduction and fluctuation in the South Yuba River downstream would protect aquatic organisms.	Same as proposed action.
	Minimum streamflows of 5 cfs year round in South Yuba River at Lang's Crossing (YB-29), resulting in elevated summer water temperatures adversely affecting resident fish.	Same as no-action alternative.	South Yuba River Supplemental Flows – Management goal to maintain 20°C in South Yuba River above Canyon Creek confluence.
	Some fish residing in canals may be lost when canals are drained during an outage.	Implementation of Fish Protection and Management During Canal Outages Plan would minimize loss of fish.	Same as proposed action.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Existing stream gages would continue to operate as designed. Unable to monitor compliance with minimum flows for stream reaches without gages.	Gaging Plan - Measure streamflow for each of the reaches with a minimum streamflow requirement. Modify existing gages or install new streamflow gages in some of the reaches with a higher or new minimum instream flow requirement.	Implement the streamflow measurement plan.
	No active plan to limit or prevent spread and growth of aquatic invasive species.	Implementation of Aquatic Invasive Species Prevention Guidelines section of filed Integrated Vegetation Management Plan would minimize the spread of aquatic invasive species.	Same as proposed action.
	No ongoing aquatic monitoring program, so effectiveness of existing measures unknown.	Implement Aquatic Monitoring Plan including fish in selected large streams and rivers, foothill yellow-legged frog, water stage and temperature, incidental recording of western pond turtle and aquatic invasive species, consistent with PG&E alternative to Forest Service condition 35.	Same as proposed action.
Terrestrial	The spread of noxious weeds can impact wildlife habitat.	Implementation of an integrated vegetation management plan on federal project lands would control the spread of noxious weeds and protect wildlife habitat.	Same as proposed action, but apply measures to non-federal project lands and protect culturally important species.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Mortality of deer and other target species would continue to occur and wildlife movement would be restricted.	Consult with California Fish and Wildlife and appropriate agencies prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings; assess wildlife escape and crossing structures annually; and annually monitor animal losses in project canals, including details of mortality. These measures would help identify ongoing issues and determine need for protection measures.	Same as proposed action with three additions; complete wildlife crossing plan for Bear and South canals to ensure appropriate design for structures; construct and update wildlife crossing structures in Drum and South Yuba canals; and prepare an annual report with recommendations to reduce animal mortalities. The resulting construction and maintenance of deer-proof fences, crosswalks, escape ramps, and other reasonable structures would minimize impacts to deer and other target species.
	Recreational use and disturbance could affect nesting bald eagles. No project-wide plan for the protection of bald eagles or bald eagle nests.	Implementation of Bald Eagle Management Plan would minimize impacts from operation and maintenance and recreational use.	Same as proposed action.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Potential for geomorphic degradation of stream channel, banks, and riparian habitat in Bear River.	Implementation measures to protect the channel morphology and riparian vegetation of Bear River upstream of Forest Service lands, including modifications to Drum canal winter operations and outage spills and assessment of baseline conditions in Bear Valley meadow would minimize degradation of riparian habitat and channel structure.	Same as proposed, but development and implementation of a Bear River Management Plan to assess riparian vegetation and bank stability conditions in the Bear River above the Drum afterbay on Forest Service lands that may be affected by high flow pulses during winter spills from Drum canal would further protect stream resources.
	No restrictions on use of pesticides or herbicides on federal land that could result in harm to environmental resources.	Same as no-action alternative.	Refrain from using pesticides or herbicides on federal land without prior written approval by appropriate agencies. Comply with pesticide restrictions specified by Forest Service, BLM, and Reclamation and recommended by California Fish and Wildlife. This measure would help protect sensitive species.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Project transmission lines could result in mortality of raptors and other birds from electrocution and collision. Continued implementation of system-wide avian protection plan for protection of birds from power lines would minimize effects.	Same as no-action alternative.	Use of raptor-safe powerline configurations consistent with Avian Protection on Power Lines guidelines for new powerlines and when replacing existing structures would minimize risk of mortality. If bird collision or electrocution issues are detected, recording incidents and retrofitting structures using the same guidelines would benefit avian resources.
	Bats that use project buildings may be affected by human activity.	Same as no-action alternative.	Document all known bat roosts within project buildings. If bats or signs of roosting are present where staff have routine presence, place human exclusion devices to prevent occupation by bats, and annually inspect exclusion devices. These measures would minimize any impacts to bats.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Recreation Resources	Existing project recreation facilities would continue to serve the public but may not meet current demand or expectations.	The Recreation Plan would provide for numerous modifications and enhancements to project recreation facilities that would increase public recreation opportunities.	Similar to proposed action, but includes additional improvements to OHV signage at Meadow Lake, campground road improvements at Lake Spaulding, accessible picnic site at Fuller Lake, no specified limit on primitive campsites at Lake Sterling, and a modified schedule for completion for facility improvements at Lake Fordyce, the Lake Spaulding Boat Launch, and Lower Peak Lake campsites. Does not include provision of added amenities (water, septic, etc.) at campground host sites.
	Existing trails within the project boundary would continue to serve the public, but may not be sufficient to meet current needs or expectations.	Trail additions and improvements proposed in the Recreation Plan would improve trails and enhance trail use.	Similar to proposed action but does not include modifications or enhancements to trails, trailheads, or trail facilities (trailhead parking, kiosks, etc.) that are located outside the project boundary, unless such trails directly connect or are intended to connect two or more project facilities.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Existing boat ramps at the project would continue to provide boat launching opportunities at Lake Valley, Lake Spaulding, and Fuller Lake under some reservoir water level conditions.	Silvertip boat ramp at Lake Valley reservoir would be extended to provide launching capabilities through Labor Day, except in critically dry years.	Same as proposed action.
	Project recreation facilities would continue to be maintained on an as needed basis.	Recreation facility operation and maintenance proposed in the Recreation Plan would ensure recreation facility maintenance is done on an appropriate schedule and would enhance the condition, usability, and safety of project recreation facilities.	Same as proposed action.
	Monitoring of recreational use at the project would continue to occur on a 6-year cycle, as needed to fulfill the Commission's Form 80 requirements.	Recreation use monitoring proposed in the Recreation Plan would enhance the level of information gathered on recreational use at the project facilities, as well as on facility condition.	Same as proposed action.
	Fish stocking would continue at selected project reservoirs. Existing levels of fish stocking may not meet current or future angler demand.	Funding of California Fish and Wildlife up to \$15,000 per year to support continued fish stocking at Lake Spaulding.	In lieu of funding California Fish and Wildlife for fish stocking, PG&E's development and implementation of a fish stocking plan for the project would ensure that fish stocking continues at existing stocked reservoirs and lakes to meet current and future ecological and recreational needs.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Existing stream flows and flow releases would provide whitewater boating opportunities along various project stream reaches at the current frequency.	Flow reductions during spill cessation at Lake Spaulding and Fordyce Lake drawdown would enhance whitewater boating opportunities at the project. Special event flow would enhance OHV crossing of Fordyce Creek.	Same as proposed action.
	Stream flow information would continue to be available at existing stream gages and through existing public information outlets.	Daily stream flow information would be available to the public via internet, which would make it easier for recreational users to check on current stream flow conditions at river/stream reaches directly affected by project operations.	Same as proposed action.
Cultural	Significant cultural resources (i.e., historic properties) would be adversely affected by project-related activities and effects.	Implementation of the HPMP upon license issuance would protect cultural resources and resolve project-related adverse effects to historic properties.	Same as proposed action, except revise the HPMP to evaluate eight cultural resource sites for National Register eligibility and assess project-related effects to those sites determined eligible, and resolve any project-related effects to them.
Land Use	Continue to maintain all project roads and facilities.	Implement the Transportation Management Plan filed with the Commission to improve road management and to ensure public access to project lands and waters and the adequate protection of natural and environmental resources.	Same as proposed action.

Table 5-1. Comparison of alternatives for the Drum-Spaulding Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Continue to follow State of California and local rules and regulations. Continue to implement emergency response preparedness requirements.	Implement the Fire Management and Response Plan filed with the Commission for federal lands to reduce the occurrence of wildfires in the project area, and to minimize damage to natural resources.	Revise the Fire Management and Response Plan to include all project lands.
	Project boundary would include facilities not necessary for the continued operation of the project and would not include all primary project roads and recreation facilities.	Revise the project boundary to remove the mineral survey area south of the Dutch Flat afterbay, the administrative site at Jackson Meadows reservoir, and the recreation road that provides access to it, and to include certain primary project roads, and new and rehabilitated recreation facilities.	Same as proposed action.
	Continue to comply with existing regulations for hazardous materials.	Same as no-action.	Develop and implement a Hazardous Substances Plan to identify acceptable prevention and mitigation measures and to ensure that hazardous substances are promptly contained or cleaned up.
Aesthetic Resources	Visual quality would be degraded by project facilities.	Implement the Visual Resource Management Plan to reduce project visual effects and improve visual quality in the project area.	Same as proposed action.

5.1.2 Comprehensive Development and Recommended Alternative

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreation opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a

waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Drum-Spaulling Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative as the preferred alternative for the Drum-Spaulling Project. This alternative includes elements of the applicant's proposal, section 4(e) conditions, resource agency recommendations, alternative conditions under EPAct, and some additional measures. We recommend this alternative because: (1) issuance of a new hydropower license by the Commission would allow PG&E to operate the project as an economically beneficial and dependable source of water and electrical energy for its customers; (2) the 185.8 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources and would provide improved recreation opportunities at the project.

Finally, for the reasons outlined in section 5.1.2.3, we recommend that certain 4(e) conditions specified by the Forest Service, BLM, or Reclamation, in whole or in part, not be included in the staff alternative. We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative would not be included in any license issued by the Commission. Instead, those staff-modified conditions would be replaced with agencies' corresponding conditions, as filed with the Commission.

Of the 23 Forest Service section 4(e) conditions we consider to be environmental measures, we include 16 of these conditions in the staff alternative as specified by the Forest Service. Of the 6 Forest Service conditions not wholly included in the staff alternative as specified by the Forest Service, we recommend modifying: (1) Flow Measures (aspects of condition 29); (2) Terrestrial Protective Measures (aspects of condition 34); (3) Monitoring Program (condition 35); (4) Large Woody Debris Management Plan (condition 36); (5) Recreation Plan (condition 41); and (6) Historic Properties Management Plan (condition no. 43). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 12/34).

Of the 27 BLM section 4(e) conditions we consider to be environmental measures, we include 22 of these conditions in the staff alternative as specified by BLM. Of the 5 BLM conditions not wholly included in the staff alternative as specified by BLM, we recommend modifying: (1) Ecological Group (condition 7); (2) Wildlife Crossings – Bear River and Drum (Chalk Bluff) Canals (condition 10); and (3) Historic Properties Management Plan (condition 21). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 13/33).

Of the 4 Reclamation section 4(e) conditions we consider to be environmental measures, we wholly include 3 in the staff alternative as specified by Reclamation and recommend that 1 condition be modified: Discovery of Cultural Resources (condition b.11).

In the following section, we make recommendations as to which environmental measures proposed by PG&E or recommended by agencies or other entities should be included in any license issued for the project. In addition to PG&E's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any license issued for the project, and we describe these requirements in the draft license articles in appendix F.

5.1.2.1 Measures Proposed by PG&E

Based on our environmental analysis of PG&E's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by PG&E would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project. Our recommended modifications to PG&E's proposed measures are shown in *italic* text.

General Measures

- Consult annually with the Forest Service, BLM, and Reclamation to review operations and monitoring data from the prior year and conduct planning for ongoing project operations.
- Conduct annual employee training to familiarize staff with special status species, noxious weeds, and sensitive areas known to occur within the project boundary on Forest Service, BLM, or Reclamation land, and the procedures for reporting to each agency.
- Implement a Coordinated Operations Plan for the Drum-Spaulding Project and the Yuba-Bear Project regarding implementation of flow-related measures in each project's license.

Geology and Soils

- Implement an Erosion Control and Slope Maintenance Plan to minimize and control project-related erosion; the plan would provide for project-wide implementation of best management practices (BMPs) to control erosion and sedimentation and more specifically include an inventory and prioritization of erosion sites on steep slopes below open project canals and spill structures and implementation of repair and restoration plans, as necessary.
- During winter to minimize potential adverse effects of high flows on channel morphology, bank stability, and aquatic and riparian habitat of the Bear River: limit operational flow releases from the Drum canal; implement ramping rates; and limit water spilled from the Drum canal to the upper Bear River through Bear Valley Meadow when the Drum afterbay is forecast to spill and the Dutch Flat no. 1 and no. 2 powerhouses are fully loaded.
- During facility outages that last more than 30 days: operate multiple spill gates from the Drum canal to more evenly distribute flows through Bear Valley Meadow; implement a 2-day ramping rate; and notify the appropriate agencies.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98. *Implement extreme critically dry water year type flows in the second year of two sequential critically dry years.*
- To enhance aquatic habitat and protect resident aquatic species, provide the same or increased minimum streamflows to eight project-affected reaches and provide new minimum streamflows to five project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Fordyce Creek – below Fordyce Lake dam	3-115
South Yuba River – below Kidd Lake dam and Lower Peak Lake dam	3-120
South Yuba River – below Lake Spaulding dam	3-121
North Fork of the North Fork American River – below Lake Valley Reservoir dam	3-126
North Fork of the North Fork American River – below Lake Valley canal diversion dam	3-129
Bear River – at Highway 20 crossing	3-133
Bear River – below Drum afterbay	3-140
Dry Creek – below Halsey afterbay dam	3-142
Rock creek – below Rock Creek diversion dam	3-143
Mormon Ravine	3-146
South Fork Deer Creek – below Deer Creek powerhouse	3-125
Canyon Creek – below Towle canal diversion dam	3-136
Little Bear River – below Alta powerhouse tailrace	3-139

- Periodically set the low-level outlet at 16 remote project dams to provide the same or increased minimum streamflows in nine project reaches and new minimum streamflows in seven project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Texas Creek – below Upper Rock Lake dam	3-102
Texas Creek – below Lower Rock Lake dam	3-103
Unnamed tributary – below Culbertson Lake dam	3-104
Lindsey Creek – below Middle Lindsey Lake dam	3-105
Lindsey Creek – below Lower Lindsey Lake dam	3-106
Lake Creek – below Feeley Lake dam	3-107
Lake Creek – below Carr Lake dam	3-108
Rucker Creek – below Blue Lake dam	3-109
Rucker Lake – below Rucker Lake dam	3-110
Unnamed tributary – below Fuller Lake dam	3-111

Project-Affected Reach	Table No. in Appendix A-2
Unnamed tributary – below Meadow Lake dam	3-112
White Rock Creek – below White Rock diversion dam	3-113
Bloody Creek – below Lake Sterling dam	3-114
Unnamed tributary – below Kidd Lake dam	3-118
Cascade Creek – below Lower Peak Lake dam	3-119
Sixmile Creek – below Kelly Lake dam	3-128

- Notify licensing participants at the annual consultation meeting of all annual planned and non-routine planned canal outages. Implement modified minimum streamflows in project canal-affected stream reaches during the first 30 days of canal outages, as shown in appendix A-2, table 3-181. For canal outages anticipated to extend past 30 days, consult with agencies and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage. Drum and Bear River canals would not be taken out of service at the same time.
- Coordinate operations with the Yuba-Bear Project at Rollins dam and Bear River canal diversion dam to ensure maintenance of minimum streamflows downstream in the lower Bear River.
- To expand recreational whitewater boating opportunities and support Supplemental Flow releases downstream from Lake Spaulding to the South Yuba River, draw down Fordyce Lake beginning in late spring with an initially high target flow (250 to 450 cfs) until the lake reaches 29,000 acre-feet of remaining storage and then make equally apportioned releases throughout the rest of the year to reach an end-of-year storage of 7,500 to 10,000 acre-feet.
- Construct and operate two 1-cfs flow release devices near the existing spillway at the Drum canal to provide controllable minimum streamflows to the Bear River upstream of the Drum afterbay.
- To reduce the risk of stranding of aquatic resources below Lake Spaulding dam, adhere to Lake Spaulding spill cessation schedules and minimize flow fluctuations in the South Yuba River below Lake Spaulding, as shown in appendix A-2, table 3-182 and table 3-183.
- Implement the Fish Protection and Management during Canal Outages Plan to minimize fish losses when canals are drained for maintenance and repair.
- Design and install new or modify existing streamflow gages to measure new minimum streamflows, as shown in appendix A-2, table 3-188.
- Provide minimum streamflows and canal outage minimum flows in Auburn Ravine below the Wise and Wise No. 2 Developments and South canal release point, as shown in appendix A-2, table 3-144, of the draft EIS to protect and enhance resident aquatic resources and their habitat.
- Set the low-level outlet at 16 remote project dams on a periodic schedule to comply with proposed minimum streamflows.

- Implement an Aquatic Monitoring Plan to assess the effects of the proposed flow modifications on aquatic resources in selected project-affected stream reaches, to include monitoring fish, foothill yellow-legged frog, and observation of western pond turtle and non-native invasive species in larger stream reaches where new streamflow conditions would likely have the greatest effect on aquatic habitat and water.
- Implement the Aquatic Invasive Species Prevention Guidelines within the proposed Integrated Vegetation Management Plan to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement an Integrated Vegetation Management Plan that combines all measures related to the management of terrestrial vegetation at project facilities and recreation sites and controls the spread of non-native invasive species, *as revised to include all project lands (i.e., both federal and non-federal project lands) and to protect culturally important species.*
- Monitor animal losses from drowning in project canals *and prepare an annual report that includes recommendations address animal mortalities including implementation schedule and schedule of implementation and distribute to appropriate agencies.*
- Consult with California Fish and Wildlife, the Forest Service, and BLM when replacing wildlife escape and crossing facilities.
- Implement measures to protect the channel morphology and riparian vegetation of the Bear River upstream of Forest Service lands, to include modifications to Drum canal winter operations and outage spills and assessment of baseline conditions in Bear Valley meadow. *Modify plan to include use of level loggers and monumented cross-sections.*
- Implement a Bald Eagle Management Plan to protect eagle nesting from disturbance during project operations and maintenance, and project-related recreation activities.

Threatened and Endangered Species

- Implement VELB conservation measures to avoid or minimize the loss of elderberry shrubs.

Recreation Resources

- Implement the Recreation Plan for upgrades, maintenance, and development of new project recreation facilities on federal project lands, *as modified with regard to the implementation schedule, trail development, campground upgrades, accessibility improvements, parking and road improvements, signage, water systems, maintenance, and recreation monitoring and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose.*
- Provide daily average streamflow information related to recreation boating opportunities to the public via the internet from May 1 through November 30 for: South Yuba River at Cisco (above Lake Spaulding); Fordyce Creek (below Fordyce Lake); South Yuba River (below Lake Spaulding dam); Bear River (at Highway 20); and Bear River (below Drum afterbay), *as modified to provide information year-round.*

Cultural Resources

- Implement an Historic Properties Management Plan (HPMP) upon license issuance to ensure protection of cultural resources and resources that are eligible for inclusion in the National Register of Historic Places, *as modified to include evaluation of eight cultural resource sites for their National Register eligibility; for those sites determined to be eligible, include an assessment of effects and resolution of project-related adverse effects.*

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan to ensure that project roads are adequately maintained.
- Implement a Fire Prevention and Response Plan on federal project lands to provide fire prevention procedures, reporting, and safe fire practices for PG&E personnel and contractors responsible for operating and maintaining the project, *as revised to include all project lands and to include a period of review and revision.*
- Implement a Visual Resource Management Plan on federal lands to protect visual and aesthetic resources on and adjacent to project lands.
- Revise the project boundary to remove the Jordan Creek diversion and conveyance system and to include certain primary project roads, and new and rehabilitated recreation facilities after the facilities are decommissioned.

5.1.2.2 Additional Measures Recommended by Staff

In addition to PG&E's proposed measures listed above (and modified as indicated), we recommend the following staff-recommended measures in any license that may be issued for the Drum-Spaulding Project:

- Develop and implement a Large Woody Debris (LWD) Management Plan that would monitor existing conditions and guide development of stream-reach and facility-specific management plans to pass LWD at project dams and diversions for protection and enhancement of downstream aquatic habitat.
- Develop and implement a Bear River Management Plan to assess riparian vegetation and bank stability conditions in the Bear River above the Drum afterbay on Forest Service lands that may be affected by high flow pulses during winter spills from Drum canal. As part of the plan, provide baseline and long-term monitoring of riparian vegetation, erosion and bank stability, and fixed geomorphic baseline channel transects.
- Provide additional summer flows to the South Yuba River below Lake Spaulding dam (Spaulding No. 1 and No. 2 Development) to manage water temperature for resident aquatic resources by implementing the Supplemental Flow Schedule as specified by Forest Service condition 29.
- Establish an Ecological Group to support implementation, review, and management of the South Yuba River supplemental flow releases below Lake Spaulding dam.
- Develop and implement Jordan Creek diversion decommissioning plan for the proposed removal of water diversion and transport structures that have not been used for project operations for many years.

- Obtain prior agency approval and restrict the use of pesticides near special status species on federal project lands.
- Construct and modify seven wildlife crossings on Drum and South Yuba canals to minimize wildlife injury and mortality associated with movement across these project canals.
- Develop a wildlife crossing plan for the Bear and South canals to minimize mortality and improve wildlife movement.
- Annually review the Forest Service, BLM, federal, and state special status species lists and assess new species on federal land to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Record annually all incidental observations of bird collision/electrocutions along the Bowman-Spaulding transmission line and replace or retrofit problem power poles as appropriate. Use raptor-safe powerline design for new power lines or when replacing existing structures to reduce raptor injury and mortality.
- Implement bat management measures, including installing exclusion devices to minimize disturbance during project operation and maintenance.
- Develop and implement a fish stocking plan for stocking in Lake Spaulding, Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, but also includes provisions for stocking fish in additional project reservoirs based on monitoring of recreational use and angling pressure over the term of the new license (replaces PG&E's proposal to pay for fish stocking).
- Develop and implement a hazardous substances plan for oil and hazardous substances storage and spill prevention and cleanup.

Below, we discuss our rationale for some of the key proposed and additional staff-recommended measures.

Minimum Streamflows

To protect and enhance aquatic resources, PG&E, the Forest Service, BLM, and California Fish and Wildlife have agreed on minimum streamflows for all project-affected reaches. These flows would generally be the same or higher than under the existing license and, in some cases, higher than estimated unregulated streamflows during the dry summer period. Many of these project-affected stream reaches have no minimum streamflow requirement under the existing license.

The proposed minimum streamflows vary depending on six water year types from extreme critical dry to wet based on California DWR Bulletin 120. These flows, particularly in larger stream reaches with higher base flows, would create seasonal and interannual flow variability more typical of natural unregulated streams. Extensive analysis by PG&E of the relationship of habitat and flow in these reaches supports the finding that the proposed higher minimum streamflows and increased flow variability would protect and enhance aquatic habitat for resident species by increasing habitat, maintaining stream channel geometry, vegetative structure, and gravel or woody debris movement, initiating spawning or upstream and downstream fish migration, and providing rearing habitat in off-channel, floodplain, or side channel areas. We estimate that the annualized cost to deliver the proposed minimum streamflows would be \$2,972,000 with an additional \$10,000 annual cost to determine and implement flows based on water year types. We recommend adopting these flow measures, because the substantial benefits to fish habitat are worth the cost.

The compliance point (gage YB-196) for minimum streamflows released to the Bear River from Rollins dam (Yuba-Bear Project) is located downstream of Drum-Spaulding's Bear River canal diversion dam. PG&E proposed to implement the measures specified by BLM under section 4(e), and recommended by Forest Service under section 10(a) and California Fish and Wildlife under section 10(j), to coordinate operations with NID, such that releases from the Rollins Development and diversions to the Bear River canal are adequately balanced to ensure compliance with minimum streamflows downstream in the Bear River. We estimate that the annualized cost to implement this coordination plan would be \$5,000. We recommend adopting this measure as an effective way to ensure continuous compliance with proposed minimum streamflows in the lower Bear River below the Rollins development and Bear River canal diversion dam at a reasonable cost.

PG&E also proposed two methods for demonstrating compliance with its proposed minimum streamflows depending on the location and accessibility of the dam and the flow control structure. At dams where winter access is not an issue, compliance would be measured by the continuous, instantaneous record from designated existing, modified, or new stream gages maintained and operated consistent with USGS protocols. However, at specified remote locations, particularly where safety is an issue for winter access, compliance with minimum streamflows would be ensured by periodically setting the dam outlet structure to provide the required minimum streamflow. Given the safety constraints, we conclude that this is a reasonable approach for determining compliance with minimum flow requirements. We estimate that the annualized cost to implement these two streamflow compliance measures would be \$570,000. We recommend these proposed compliance measures, because they would be an effective mechanism to demonstrate compliance with proposed minimum streamflows at a reasonable cost.

Minimum Streamflows in Auburn Ravine

NMFS (recommendation 7) recommends year-round minimum flows of 6 cfs in Auburn Ravine at the South canal release point to support anadromous salmonids. NMFS does not provide a habitat analysis or other basis for their minimum flow recommendation. PG&E's proposed minimum streamflows for Auburn Ravine range from 2 cfs to 18 cfs and are supported by their habitat-flow analysis. These proposed minimum streamflows are also recommended by BLM, Forest Service, and California Fish and Wildlife and are the same or higher than minimum streamflows recommended by NMFS in March and April of dry to wet water years, but are less than the NMFS recommendation in other months and years.

Numerous non-project consumptive water withdrawals and deliveries cumulatively affect flows in designated critical habitat in Auburn Ravine in the 2.6-mile-long stream reach between Auburn tunnel and non-project Auburn Ravine 1 diversion dam, the upstream barrier to adult steelhead migration. With regard to the project, operations at Wise and Wise no. 2 powerhouses directly affect flow and aquatic habitat in Auburn Ravine between PG&E's release from South canal (RM 27.5) and PCWA's Auburn tunnel (RM 26.4). The upstream extent of designated critical habitat for Central Valley steelhead in Auburn Ravine is Ophir cataract (RM 26.6), 0.2 mile above Auburn tunnel. This 0.2-mile-long reach of Auburn Ravine is the only designated critical habitat directly affected by project operations, but the downstream barriers to adult steelhead migration noted above, make it unlikely that steelhead are found in this stream reach.

Flows proposed by PG&E and recommended by BLM, Forest Service, and California Fish and Wildlife vary by water year and month, and would support resident rainbow trout in the upper stream reach of Auburn Ravine. The 6-cfs flow recommended by NMFS in all months and water years would support steelhead in the middle and lower stream reaches of Auburn Ravine. In all months during extreme critically dry and critically dry water years, PG&E proposes minimum streamflows of 2 to 4 cfs. From May through February during dry to wet water years, PG&E proposes minimum streamflows of 4

cfs. During March and April, PG&E proposes minimum streamflows of 2 to 18 cfs, depending on water year (table 3-144, appendix A-1).

The minimum streamflows proposed by PG&E to benefit resident species are more appropriate in the upper stream reach of Auburn Ravine than are the NMFS recommended flows targeting anadromous salmonids that are unable to access this stream reach due to natural and man-made barriers. Based on PG&E's habitat-flow analysis, the 2-cfs difference between PG&E's proposed 4 flows and NMFS' recommended flows would result in only about a 1 percent increase in habitat for resident rainbow trout adults, juveniles, and spawning and about a 6 percent decrease in fry habitat. In the unlikely event that steelhead gain access to the 0.2 mile of designated critical habitat above Auburn tunnel during a rare but extreme hydrological event, we believe the higher than normal flows would provide sufficient habitat for steelhead spawning, and PG&E's flows for resident trout would provide adequate habitat for steelhead fry and juveniles. Given the numerous non-project discharges and consumptive withdrawals that occur throughout Auburn Ravine, it is unlikely that the difference between the PG&E proposal and NMFS recommendation during drier years could generate any meaningful additional enhancement in habitat for anadromous salmonids in the upper and middle stream reaches of Auburn Ravine and, in particular, in lower Auburn Ravine below Auburn Ravine 1 diversion dam.

We recommend minimum streamflows in Auburn Ravine proposed by PG&E and recommended by BLM, Forest Service, and California Fish and Wildlife. Habitat modeling indicates that PG&E's proposed minimum streamflows are adequate to protect resident aquatic resources in the project-affected reach upstream of Auburn Tunnel. We do not recommend NMFS' proposed minimum streamflows that would provide minimal improvement in available aquatic habitat relative to implementation of PG&E's proposed minimum streamflows. We estimate that the annualized cost for PG&E's proposed plan would be \$46,000 compared to an annualized cost of \$105,000 for the NMFS flows. We recommend adopting these minimum streamflows for Auburn Ravine that would benefit aquatic habitat for resident rainbow trout and aquatic resources at a reasonable cost.

Minimum Streamflows in Other Project-Affected Western Placer County Streams

NMFS recommends year-round minimum flows in two western Placer County stream reaches affected by the Wise and Wise No. 2 Developments for Central Valley steelhead and fall-run Chinook salmon in downstream reaches. NMFS' minimum streamflow (recommendation 7) includes 1 cfs in Rock Creek (a tributary to Dry Creek) below Rock Creek reservoir dam and 1 cfs in Dry Creek below Halsey afterbay. PG&E proposed minimum streamflows range between 1 and 3 cfs in Rock Creek below Rock Creek reservoir dam depending on month and water year type. These flows were also recommended by Forest Service and California Fish and Wildlife. PG&E's minimum flows would be higher than NMFS' flow during March of all years and in all months during above normal and wet years. PG&E's proposed and NMFS' recommended minimum streamflows are the same for Dry Creek.

We recommend PG&E's minimum flows proposed for Rock Creek and Dry Creek to support resident fish. PG&E's flows are equal to or greater than NMFS' recommended flows for anadromous fish. However, there are no anadromous fish in the project-affected reaches of Rock Creek below Rock Creek reservoir or Dry Creek below Halsey afterbay dam. Because of natural barriers, the upstream limit of steelhead migration is at Lower Falls (RM 34) on Coon Creek, about 7 to 8 miles below Dry Creek at Halsey afterbay and about 5 to 6 miles below Rock Creek reservoir with numerous intervening non-project discharges and diversions that cumulatively affect streamflows and aquatic resources. Habitat modeling indicates that PG&E's proposed minimum streamflows are adequate to protect resident aquatic resources in the project-affected reach on Dry Creek below Halsey afterbay and Rock Creek below Rock Creek reservoir. We recommend the minimum streamflows proposed by PG&E, and recommended by Forest Service and California Fish and Wildlife, that benefit resident aquatic resources. We note that

PG&E's flows would not benefit anadromous salmonids as they are unable to access these reaches. The cost for implementing the proposed minimum streamflows for Dry Creek below Halsey afterbay dam Rock Creek below Rock Creek reservoir dam is included in the estimated cost for implementation of project-wide minimum streamflows. We again conclude that the cost of these flows is worth the benefits to aquatic habitat.

Spill Cessation and Minimization of Flow Fluctuations in the South Yuba River

Rapid reductions in flow following a spill event can adversely affect aquatic resources in downstream reaches, particularly life stages that are immobile or have limited mobility. PG&E proposed a schedule for more gradual rate of flow reduction following spills to the South Yuba River from Lake Spaulding dam from May through September. This schedule was also recommended by Forest Service and California Fish and Wildlife. The proposal would establish a two-step schedule for flow reduction: first when flows are greater than 250 cfs following a spill for recreational whitewater boating opportunities; and second when flows are between 250 cfs and the specified minimum streamflow to benefit aquatic resources. The schedule would reduce streamflows from the end of the spill to the specified minimum streamflow over 2-6 days at the higher flow schedule and up to 21 days at the lower flow schedule. In addition, PG&E would make a good faith effort to not make releases from Lake Spaulding dam that result in short-term, high-flow fluctuations; that is, no streamflow increase of 100 percent or greater in the South Yuba River during a 12-hour period.

PG&E's proposed spill cessation measures would minimize the rapid fluctuations in flow associated with the end of spill events at Lake Spaulding dam, which would reduce the likelihood of stranding of aquatic organisms. We recommend adopting this measure because it would result in flow reductions following spill events that mimic the natural recession from high flows and provide a substantial benefit to fish and aquatic habitat at a reasonable annual cost of \$53,000.

Canal Outages

In certain situations, flows released from project canals to stream reaches provide minimum instream flows for protection of aquatic resources. When these canals are taken out of service during planned maintenance or during unplanned emergencies, the canals drain and become dry. In these instances, flow releases from the canals to the stream reaches are interrupted and flow in the stream reaches downstream of the canal are maintained only by inflow, which at some locations could be reduced to no flow during some months.

PG&E identified project-affected stream reaches where its ability to deliver minimum streamflows could be affected during maintenance and emergency outages of project canals, conduits, and flumes. During canal outages, PG&E proposes to meet the required minimum flow for that month and water year, or the natural inflow, whichever is less. The Forest Service, BLM, and California Fish and Wildlife recommend PG&E's proposal except for canal outages that affect flows in Auburn Ravine, as discussed below. NMFS did not address flows during canal outages. PG&E proposes to notify all licensing participants at the annual consultation meeting of the past year unplanned and future year planned canal outages, and also propose to notify and consult with licensing participants if a canal outage is anticipated to extend beyond 30 days. The resource agencies recommend these same procedural measures for canal outages.

BLM and California Fish and Wildlife recommend that during a canal outage affecting the South canal release point, the minimum streamflow in Auburn Ravine would be the specified minimum streamflow for that month and water year or 5 cfs, whichever is less. However, the canals themselves are the only source of water that can provide any minimum streamflows. Therefore, during outages of the upstream canal system that delivers Bear River water through the Wise and Wise No. 2 Development to

the South canal, no source of water is available for PG&E to augment flows in Auburn Ravine. We, therefore, cannot recommend the BLM and California Fish and Wildlife minimum streamflow during canal outages that affect this reach.

PG&E proposes and BLM, Forest Service, and California Fish and Wildlife recommend implementation of a plan to protect fish residing in project canals when a canal is drained during a planned, unplanned, or emergency outage. PG&E filed (August 30 2012) a Fish Protection and Management during Canal Outages Plan that identifies the canals, locations and procedures for fish collection and rescue, and procedures for notifying the resource agencies. The plan would be implemented within the first year following issuance of the license for the Drum-Spaulling Project. We estimate that the annualized cost of this plan would be \$30,000. We recommend adopting this measure because it would reduce fish mortality associated with canal outages during planned maintenance and during unplanned emergencies at a reasonable cost.

Fordyce Lake Drawdown

PG&E proposed a schedule for drawdown of Fordyce Lake beginning in the spring once spills at Fordyce Lake and Lake Spaulding have ceased in order to sustain higher flows. PG&E also proposes a gradual reduction in flows in Fordyce Creek between Fordyce Lake and Lake Spaulding. This measure is also recommended by Forest Service and California Fish and Wildlife. This measure would result in a gradual reduction in flows from high spring flows to the minimum streamflow specified for the month and water year type. Following spill termination, flows in Fordyce Creek would be maintained between 475 cfs and 250 cfs until storage in Fordyce Lake reaches about 59 percent (29,000 acre-feet) of maximum storage. The next 19,000-21,500 acre-feet of storage would be equally apportioned through the end of the year, leaving 7,500-10,000 acre-feet of carryover to meet winter minimum streamflows. At the end of the third week of August flows in Fordyce Creek would be held at about 50 cfs for a 10-day period to accommodate a recreational event.

PG&E's proposal would result in a Fordyce Lake drawdown earlier in the year than under the existing license. However, this would augment the coldwater pool downstream in Lake Spaulding necessary to support supplemental flow measures for water temperature management in South Yuba River below Lake Spaulding dam. The measure also provides higher flows in Fordyce Creek below Fordyce Lake dam to support recreational whitewater boating opportunities. We recommend adopting this measure because it would provide a substantial benefit to fish habitat and recreation at a reasonable annual cost of \$5,000.

South Yuba River Supplemental Flows

PG&E's studies and hydrologic and habitat modeling provided extensive information related to the relationship between flow and water temperature in the South Yuba River between Lake Spaulding dam and Englebright reservoir. The South Yuba River below Lake Spaulding provides cold water habitat for populations of resident rainbow trout and brown trout and provides recreational angling opportunities. Breeding populations of foothill yellow-legged frog have also been found in this reach.

Under current project operations, elevated water temperatures in some reaches, particularly during hot dry years, can be stressful to resident rainbow trout, but higher flows and associated lower water temperatures can be stressful to other components of the aquatic community, including the foothill yellow-legged frog. Optimum temperatures for breeding and development of foothill yellow-legged frog are at the upper end of the range of temperatures that are suitable to rainbow trout. Thus, cooler summer water temperatures in some streams that benefit trout may inhibit development of foothill yellow-legged frog. Minimum flows proposed by PG&E (and specified by the Forest Service) would increase flow and reduce temperatures, particularly between Lake Spaulding dam (RM 41.1) and the confluence of Canyon

Creek (RM 32.5); however, during drier water years, some augmentation of flows during the summer could provide additional enhancement for rainbow trout aquatic habitat.

Forest Service condition 29 includes the use of supplemental flows to manage water temperatures in the 8.5-mile reach of South Yuba River between Lake Spaulding dam and Canyon Creek. PG&E agrees to include these supplemental flows.

California Fish and Wildlife (recommendation 2.9) and Foothill Water Network recommend a measure to manage cooler water temperatures over a longer reach of South Yuba River; they recommend allocation of up to 2,500 acre-feet of water (block flows) each year for management of water temperature in the South Yuba River between Lake Spaulding dam and Poorman Creek (RM 28.1). They indicate that one objective of this plan would be to extend optimum rainbow trout habitat farther downstream to areas that are more accessible to anglers by reducing water temperatures in the 4.4-mile-long reach between Canyon Creek and Poorman Creek.

The goal of the Forest Service's Supplemental Flow schedule for South Yuba River is to maintain water temperatures above Canyon Creek at 20°C or less. California Fish and Wildlife's Block Flow management goal is to achieve 20°C temperatures above Poorman Creek and 19°C above Canyon Creek. The reach of the South Yuba River between Canyon Creek and Poorman Creek is also affected by inflows from the Yuba-Bear Project; thus, PG&E cannot fully control temperatures downstream of Canyon Creek. The 20°C objective above Poorman Creek is substantially colder than median temperatures that would otherwise exist in this stream reach under unregulated conditions during the summer months. PG&E's water temperature modeling results (filed August 31, 2012) demonstrate that temperature typically increases 2 to 3°C in the South Yuba River between Canyon Creek and Poorman Creek during the summer. Thus, to achieve California Fish and Wildlife's objective of 20°C at Poorman Creek, temperatures at Canyon Creek would need to be about 17 to 18°C during the summer and substantially colder upstream to Lake Spaulding dam. As noted above, these colder summer water temperatures would likely have an adverse effect on foothill yellow-legged frog habitat in the South Yuba River above Canyon Creek.

Given the potential of the higher flows proposed in California Fish and Wildlife's Block Flow proposal to adversely affect foothill yellow-legged frog, we conclude that implementation of the Forest Service's Supplemental Flow schedule would better protect and enhance the aquatic community as a whole, including populations of both resident trout and foothill yellow-legged frog, in the affected stream reach. Although the Block Flow recommendation would increase downstream angling opportunities for resident rainbow trout, it would also have a larger negative impact on water supply and power generation than the Forest Service's Supplemental Flow condition and would include pulse flows that could also harm foothill yellow-legged frogs. For these reasons, we do not recommend the Block Flow recommendation of California Fish and Wildlife and Foothill Water Network, but instead recommend the better defined, more balanced, and more flexible Forest Service Supplemental Flow schedule. Implementation of the Forest Service's Supplemental Flow condition in conjunction with aquatic monitoring proposed for this reach would provide data adequate to assess the benefits of these additional flows over a multiple year time frame.

The estimated annualized cost to implement the Forest Service condition is \$149,000 and the more comprehensive protection of the South Yuba River aquatic habitat is worth this cost.

Aquatic Invasive Species Management Plan

The Forest Service (condition 33) specifies and California Fish and Wildlife (recommendation 6) recommends that PG&E prepare and implement an Aquatic Invasive Species Management Plan. These agencies identify the types of information that should be included in the plan. PG&E proposes an

Integrated Vegetation Management Plan (August 29, 2012) that includes a section (*Aquatic Invasive Species Prevention Guidelines*) for monitoring and management of aquatic non-native invasive species in project waters. In general, the PG&E plan contains the types of information identified by Forest Service and California Fish and Wildlife including prevention and educational measures, incidental monitoring, contingency measures if invasive species are found in project waters, and provisions for modification of the plan if more-effective control measures are developed in the future. We recommend that PG&E implement the Aquatic Invasive Species Prevention Guidelines that are included in the Integrated Vegetation Management Plan. The estimated annualized cost for implementation of PG&E's plan is about \$20,000. This would be a reasonable cost to the project and would provide protection from aquatic invasive species within the project boundary.

Aquatic Monitoring Plan

As discussed in section 3.3.2.2, proposed increases in minimum flows, supplemental flows, and management of spill cessation flows could affect habitat for resident fish species and the foothill yellow-legged frogs resulting from changes in habitat suitability, water temperature, aquatic and riparian vegetation, and channel morphology. Forest Service (condition 35) specifies and California Fish and Wildlife (recommendation 8) recommends that PG&E develop a monitoring plan that would include monitoring of aquatic species, non-native invasive species, sensitive plants, recreation resources, cultural resources, wildlife crossing placement and effectiveness, and sensitive raptors. PG&E's alternative to Forest Service condition 35 would implement the Aquatic Monitoring Plan filed with the Commission (August 29, 2012). The Aquatic Monitoring Plan would assess the effects of new license conditions on the distribution, abundance, and conditions of fish populations and foothill yellow-legged frog in selected stream reaches most likely to be affected by those new license conditions. The plan includes: (1) locations of specific reaches to monitor; (2) species to monitor at each location; (3) methodology for monitoring of each species; and (4) installation of water temperature loggers between spring and fall in all study reaches.

PG&E's plan would include only incidental observations of western pond turtle, another special status species. However, specific surveys for western pond turtle specified and recommended by the agencies are not appropriate because it is unlikely that this species would be affected by project O&M activities. Nesting and hatching success, key factors affecting the success of populations of western pond turtle that occur in terrestrial habitat, are not affected by changes in project flows and riparian habitat. In addition, effective survey methods for identification of nesting sites have not been developed and focused surveys for western pond turtle in the project boundary are not likely to provide any more detailed data than PG&E's recording of incidental observations.

PG&E's alternative 4(e) plan is generally consistent with the Forest Service's proposed framework for aquatic monitoring, addresses important aspects of the proposed monitoring, and provides a focused approach with sufficient detail for monitoring of aquatic resources. However, the agencies monitoring plan is more comprehensive than PG&E's plan. Our review indicates that monitoring of other resources (wildlife, non-native invasive species, terrestrial, recreation, and cultural) specified and recommended by the agencies would be duplicative of the monitoring required by other conditions.

Implementation of proposed minimum streamflows, Supplemental Flows in the South Yuba River, spill cessation schedules, and Lake Fordyce drawdown have been proposed in part to maintain cooler water temperatures to benefit aquatic resources in the affected reaches. PG&E's proposed Aquatic Monitoring Plan would include monitoring of water temperature in the study reaches providing information to evaluate the effectiveness of these flow-related measures for water temperature management and the effects on aquatic biota. In addition, implementation of PG&E's Aquatic Monitoring Plan would provide monitoring of aquatic resources within the project boundary, including

observations of the foothill yellow-legged frog and western pond turtle. PG&E estimated the annualized cost for its Aquatic Monitoring Plan would be \$293,000 and we conclude that the monitoring information would be worth this cost.

LWD Management Plan

LWD currently passes over small high elevation dams and diversion dams during periods of high flow. At larger project dams (e.g., Lake Spaulding dam), LWD is collected periodically and stockpiled for burning or disposal. Forest Service condition 36 specifies and California Fish and Wildlife recommends a project-wide LWD management program, including survey of locations and quantity of LWD collected and identification of appropriate locations downstream of project dams for reintroduction of LWD for mobilization during 2- and 5-year flow events. PG&E has agreed to develop and implement an LWD management plan that meets these specifications.

NMFS and FWS recommend development of a specific LWD Management Plan for future implementation to enhance habitat for eventual reintroduction of spring-run Chinook salmon and Central Valley steelhead in the South Yuba River below Lake Spaulding dam. NMFS also recommends an interim measure for passage of LWD at Lake Spaulding dam beginning at license issuance until a LWD Management Plan can be developed and implemented when reintroduction occurs.

Available information suggests that some existing habitat conditions associated with LWD would likely support anadromous salmonids. PG&E's studies indicated that the amount of LWD observed in project affected stream reaches is less than observed in other Sierra Nevada streams and is frequently not immersed within the stream channel (section 3.3.2.2, *Aquatic Resources, Environmental Effects*). Studies in the central Sierra Nevada region outside the project area reported that LWD is typically stable with little movement and played a limited role in aquatic habitat formation and cover. PG&E reported that the volume of LWD transported to and removed from project reservoirs is also relatively low and that LWD passes over most project dams and diversion dams (if it is not captured by log booms) during periods of high flow.

We recommend the development and implementation of an LWD management plan that includes the criteria defined in California Fish and Wildlife's recommendation 9, and Forest Service condition 36. The combination of these measures identifies specific locations for LWD management, and describes the extent and frequency of surveys to assess the effectiveness of LWD mobilization and dispersal in the downstream reaches. LWD contributes to productive aquatic ecosystems and is an important component in the formation of complex aquatic habitat units and channel maintenance in some systems. We recommend adopting this measure because additional LWD surveys would identify stream reaches that require LWD management and could provide a substantial benefit to fish habitat at a reasonable annual cost of \$58,000.

Finally, we do not recommend implementation of the interim LWD measure proposed by NMFS for introduction of LWD into the South Yuba River below Lake Spaulding dam. The LWD Management Plan that we recommend above would require an LWD survey that would provide information for developing LWD management plans which would be implemented for specific stream reaches, as appropriate. This information would be used to evaluate the need for introduction of LWD in project-affected stream reaches and is more appropriate to the existing aquatic resources in the South Yuba River.

Bear River Management Through Bear Valley

Under current project operations of the Drum canal, occasional high flows that are released from the canals, particularly during winter operations and outages of Drum canal or Drum no.1 and no. 2 powerhouses, could affect the condition of the stream channel and riparian habitat of the Bear River

between the canal release points and Drum afterbay. However, PG&E and PCWA submitted qualitative information including a 70-year historical aerial photographic record that indicates that spill operations at the Drum and South Yuba canals have not had the expected adverse effects on aquatic and riparian habitat in the upper Bear River above Drum afterbay and that the location of the Bear River channel in this reach is stable and relatively unchanged over the past 70 years. These data also suggest that aquatic and riparian impacts in this stream reach may be associated, at least in part, with historical non-project land uses. Despite these data, PG&E proposed to perform a qualitative assessment of sustained flows above 350 cfs to provide information regarding potential impacts to channel morphology and riparian vegetation and inform the development of protection and mitigation measures. PG&E also proposed interim measures for management of spill flows, reducing the magnitude of spills and more evenly distributing the spills over and longer reach of the Bear River to further reduce potential effects on aquatic and riparian habitat.

California Fish and Wildlife recommends that PG&E develop and implement a management plan for the Bear River Valley above Drum afterbay on Forest Service lands that is identical to the Forest Service's preliminary condition 35. The Forest Service subsequently submitted condition 34, which revised and replaced its preliminary condition 35. Forest Service condition 34 provides a more-detailed scope of monitoring activities and quantitative data collection compared to preliminary condition 35, outlining baseline surveys with follow-up annual and spill-event-based monitoring to better document channel and riparian conditions potentially affected by Drum canal and South Yuba canal operations. The Forest Service condition specifies opportunities for consultation and review of monitoring results and review of recommended mitigation measures. The Forest Service (recommendation 5) also recommends measures to reduce the magnitude and distribute the locations of spills to the Bear River from Drum canal upstream of federal lands that are similar to PG&E's proposal. PG&E recommended adoption of both measures.

Existing studies have shown that the meadow sub-reach of Bear River Reach #2 was rated as "Functional, At Risk" (PG&E and NID, 2011a). This study also documented this Bear River Reach #2 as having an incised channel with some localized bank failures; a head-cut migration from the main channel; an incised main channel with vertical banks that are susceptible to failure; and additional small, localized failures.

The historical photo evidence provides qualitative evidence that riparian conditions have improved in some areas but provides no quantitative baseline information for comparison to future monitoring. It remains unclear the relative contribution of project effects as compared to non-project effects. Data is needed to establish baseline condition and to compare trends over time.

We recommend that PG&E submit a plan for quantitative baseline documentation of channel morphology, sediment conditions, bank stability and erosion sensitive areas, and condition of riparian vegetation in the Bear River upstream of Drum afterbay on Forest Service lands during the first year following license issuance, as specified in Forest Service condition 34. The baseline study would create fixed surveyed transects to be used to document changes in channel morphology over time and in response to high flow events, in particular. Ongoing annual monitoring and event (flows greater than 400 cfs at gage YB-198) monitoring for comparison to documented baseline conditions should continue for 5 years and thereafter at 3-year intervals. This plan would provide a mechanism to distinguish project-related effects from effects associated with other non-project historical land uses and to recommend focused plans to mitigate specific project-related effects that might be identified during this monitoring program. Annual reports from the program would provide recommendations for mitigation of adverse effects associated with project operations in this reach of the Bear River. We also recommend that PG&E implement the Forest Service recommendation to manage winter operations spills and outage spills from Drum canal to Bear River. We believe that the estimated annualized cost to implement the Forest Service

condition of \$278,000 is worth the benefits to channel geomorphology, bank stability, and protection of riparian vegetation in the Bear River.

We do not recommend adopting the California Fish and Wildlife recommendation, which does not identify specific information to be collected in order to document the effects of canal operations on this reach of the Bear River. Their recommendation focused primarily on modification of spill releases from Drum canal to Bear River to prevent habitat impacts without identification of the effects of project operations that have occurred or that may require mitigation. California Fish and Wildlife did not provide estimated costs for its recommendation, nor did it provide adequate detail for us to develop an estimate of the cost of their recommendation.

Integrated Vegetation Management Plan

Invasive weeds occur throughout the project area. Project operations, maintenance, and recreation can act as a method of seed dispersal and create disturbed areas favorable to the spread of invasive weeds. PG&E's Integrated Vegetation Management Plan only covers federal lands, excluding PG&E and private lands located within the project boundary. Invasive weed populations are known to occur outside federal lands and are subjected to similar project-related effects within PG&E's boundary. Therefore, we recommend that PG&E expand these plans to include all lands within the project boundary to the extent that access is allowed. The estimated annualized cost for the recommended invasive weed management and vegetation management plans is about \$93,000 per year. Expanding the plan to accessible non-federal project lands would increase the cost by an additional \$372,000 per year. This would be a moderate cost to the project and would provide adequate protection to native plant species within the project boundary.

Additionally, we recommend that PG&E protect plant species that are culturally significant to the tribes as part of their vegetation management plan.

Wildlife Crossings for Drum, South Yuba, and Towle Canals

The Forest Service, in condition 34, specifies and California Fish and Wildlife recommends that PG&E develop a wildlife crossing plan for Drum, South Yuba, and Towle canals. The condition specifies the minimum specifications—a minimum distance of 0.75 mile apart and overcrossings with a 12-foot width and 8-foot-high side railings and access ramps less than or equal to 30 percent grade. The measure also specifies that PG&E annually monitor and report crossing conditions, and maintenance and repair activities. BLM provides similar conditions for the Drum canal (condition 10).

In response, PG&E filed an alternative condition that outlines seven specific locations within both the Drum and South Yuba canals where new crossings would be constructed or the footbridge of existing crossings would be retrofitted. PG&E's alternative condition would design overcrossings for the Drum and South Yuba canals at a minimum distance of 1 mile apart and meet the minimum specifications of 8-foot width, 4-foot-high side railings, and access ramps less than or equal to 40 percent grade. PG&E would retrofit identified existing crossings by replacing or covering the existing metal footbridge decks with wood or similar synthetic material, and replacing stairs with unobstructed access ramps. PG&E would also submit final designs for each crossing. PG&E would annually monitor and report crossing conditions, and maintenance and repair activities consistent with Forest Service condition 34. PG&E does not believe that additional measures are necessary at the Towle canal.

As discussed in section 3.3.3.2.2 *Wildlife Movements and Mortality*, even though mortalities at these canals have been low (three in 2009), improved passage would reduce distances between crossings and minimize barriers to wildlife movement in the Drum and South Yuba canals,

benefiting the local wildlife populations. Additional and improved crossings would benefit local wildlife populations. The Forest Service condition specifying wider wildlife crossings at closer distances, however, is not supported by appropriate existing literature, would result in an unnecessary cost for PG&E, and would not provide additional benefits to wildlife resources. PG&E's alternative for wildlife crossings in the Drum and South Yuba canals is appropriate to reduce wildlife mortalities in these canals, and protect target wildlife resources that commonly use these project features and surrounding habitats. We, however, recommend 8-foot-high side-railings to better prevent deer from entering the canals.

Further, there have been no reported mortalities at the Towle canal and the distance and condition of existing wildlife crossings in the canal is appropriate for wildlife resources. Therefore, we agree with PG&E that construction of new wildlife crossings in the Towle canal would be an unnecessary expenditure and would not result in additional benefits to wildlife resources.

The implementation of the Forest Service condition for wildlife crossings in the Drum, South Yuba, and Towle canals would result in a total cost of \$700,000 as compared to PG&E's alternative, which would result in a total cost of \$500,000. The agencies' measures would not result in additional protection to wildlife resources to warrant the increased cost. We recommend adoption of PG&E's alternative for wildlife crossings in the Drum and South Yuba canals, but with 8-foot-high side railings, due to its lower costs while still providing adequate protection for target wildlife resources that commonly use these project features.

Wildlife Crossings for the Bear River, South, and Chalk Bluff Canals

The Forest Service (condition 34) specifies and California Fish and Wildlife recommends that PG&E develop a canal crossing plan for the Bear River and South canal. BLM (condition 10) is similar but includes the Bear, Drum (discussed in previous section), and Chalk Bluff canals. As discussed in the previous section, PG&E's alternative condition provides for smaller crossings than those specified or recommended by the agencies. Crossings would be approximately every 1 mile in combination with natural landscapes that provide crossing opportunities.

As described in section 3.3.3.2.2, *Wildlife Movements and Mortality*, there were a relatively high number of wildlife mortalities in the Bear River and South canals (37 combined mortalities, accounting for 90 percent of target species mortalities within the Drum-Spaulding Project in 2009), and the distances between wildlife crossings are in some cases more than 1 mile. For the reasons discussed above, we conclude that PG&E's canal wildlife crossing specifications are adequate to protect local wildlife populations. We, however, similar to above, recommend 8-foot-high side-railings to better prevent deer from entering the canals.

The Chalk Bluff portion of the Chalk Bluff/South Yuba canal consists of a 3.21-mile stretch that contains 12 wildlife crossings and, due to the canal characteristics, is, for the most part, wadeable by target wildlife species. Thus, the addition of wildlife crossing structures in the Chalk Bluff canal is unnecessary due to the ample availability of wildlife crossing structures and the narrow characteristics of the canal.

PG&E estimates that implementing BLM condition 10 would cost \$1.4 million over 30 years compared to \$650,000 for PG&E's alternative and that Forest Service condition 34 would cost \$750,000 compared to \$150,000 for PG&E's alternative. The more expensive agencies' measures would not substantially improve passage or reduce mortality compared to PG&E's alternative condition and are not worth the additional cost. Therefore, we recommend that PG&E develop a wildlife crossing plan for Bear River and South canals consistent with the PG&E alternative 4(e) condition but with 8-foot-high side railings.

Project Powerlines and Raptor Collisions/Electrocutions

Forest Service condition 34 and BLM condition 15 specify and California Fish and Wildlife recommends that PG&E record annually all incidental observations of bird collision/electrocutions along the Bowman-Spaulding transmission line. Observations would include date and location, species and number of birds, bird condition (i.e., dead or injured), band number, if available, and suspected cause of death. The conditions also specify the use of raptor-safe powerline design as described in APLIC's "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006," or the most current edition of this document, for new power lines or when replacing existing structures such as poles, phase conductors, and associated equipment on project lands. If raptor collision monitoring indicates a substantial issue with raptor-project transmission line interactions, the poles where the interaction issue occurs would be replaced or retrofitted, as agreed via consultation with the Forest Service, FWS, and California Fish and Wildlife. The recording of incidental observations of bird collision/electrocutions at the Bowman-Spaulding transmission line and the use of APLIC's "Suggested Practices for Avian Protection on Power Lines" would protect birds, including bald eagles, which habitually use powerline and other energized equipment within the FERC project boundary. The benefits would be worth a levelized total annual cost of \$73,000 (\$7,000 to record collisions/electrocutions and \$67,000 to retrofit problem lines).

California Fish and Wildlife also recommends that PG&E conduct an evaluation of project power poles to determine consistency with APLIC's designs and modify those lines that do not meet APLIC standards. There is no evidence that these lines are having adverse effects to raptors or other large birds. The recording of incidental observations of dead birds, as discussed above, would provide information on problem poles and specific information to justify replacing only certain poles. Therefore, the benefits of California Fish and Wildlife's more comprehensive evaluation of project power poles would not be worth the levelized total annual cost of \$7,000, in addition to the unknown costs of correcting power pole design.

Valley Elderberry Longhorn Beetle Protection

Clearing vegetation that may threaten project facilities during the life of the project may result in a loss of elderberry shrubs that provide potential habitat for the VELB, a federally listed threatened species. PG&E has in place a system-wide VELB Conservation Program that includes the project area. The program provides for pre-construction surveys, educational training, implementation of minimization, avoidance, and protective measures, and monitoring.

Continued implementation of the program at the project would ensure that impacts on elderberry habitat would be avoided or minimized, and if impacts do occur, appropriate mitigation would be implemented. Therefore, we recommend that PG&E implement the program in relation to continued operation and maintenance of the project.

Recreation Plan

The project currently provides public recreation opportunities, and PG&E proposes extensive development, expansions, modifications, upgrades, and maintenance of public recreation facilities in its proposed Recreation Plan. However, for reasons noted below, we recommend that PG&E include our additional staff recommended recreation measures in its proposed recreation plan, as well as our recommended changes to the schedule for completing the proposed measures.

Individual recreation measures contained in the proposed recreation plan address the majority of project effects and meet identified recreation needs at the project. However, we also recommend several elements specified by the Forest Service in condition 41.

Implementation Schedule—Most of the facilities are in a functioning condition, and visitor needs are currently met by the spectrum of facilities and their existing condition. However, some of the existing recreation facilities are currently, or would soon be, in need of modification and/or reconstruction to meet visitor needs, protect natural resources, and provide for public health and safety. For most facilities, our recommended schedule is the same as that proposed by PG&E in the Recreation Plan. However, for some facilities we recommend an alternative schedule that is based on our assessment of the current condition of the facility and user needs. We recommend that PG&E complete the proposed campsite installation at Fordyce Lake primitive campground within 3 years, rather than within 5 years; complete the proposed improvements in signage and information measures at Lower Lindsey Lake campground within 2 years; and install the proposed campsites at Lower Peak Lake within 5 years. We consider the slight visitor inconvenience caused by delaying implementation to be minor as compared to the benefit of providing upgraded facilities that are safe and in good repair. We estimate the added cost associated with these modifications to the facility development schedule to be minor, on an annualized basis.

Trails—There are numerous trails in proximity to the project, and there is a demonstrated demand for trail use by project visitors. However, as discussed in section 3.3.5.2, *Recreation Resources*, *Environmental Effects*, and discussed further below, we find that some of the trail measures included in the proposed Recreation Plan include trails and/or trailheads that appear to be outside the project boundary, do not connect two or more project facilities, and do not serve a project purpose. Requiring PG&E to construct, reconstruct, and maintain trails necessary for project purposes would provide additional trails for visitors and ensure they are properly maintained which, in turn, would minimize resource damage, such as erosion, and provide for visitor safety. Therefore, we recommend that the proposed trail improvements included in the Recreation Plan be limited to the construction of, modification to, and maintenance of trails and trailheads that are necessary for project purposes, including: (1) the Meadow Lake pedestrian trail, which connects Meadow Knolls campground to Meadow Lake; (2) the Sierra Discovery Trail; (3) the Rucker Lake trail that connects the designated parking area to the walk-in campground; (4) the Blue Lake pedestrian trail that connects parking area to primitive campsites; and (5) the Carr Lake trail connecting new walk-in campsites.

Campgrounds and Dispersed Campsites—Some existing campgrounds and campsites do not accommodate visitor needs and require expansion. Others are in need of facility upgrades or improvements to address deteriorating facility condition, improve usability and user safety, or improve access. Formalizing dispersed campsites at Lake Sterling and Lower Peak Lake would help protect shoreline resources by eliminating unmanaged camping at informal sites, which would reduce impacts to vegetation and shoreline habitats. Repaving the campground access roads at Lake Spaulding campground would benefit the recreating public by creating a safer situation for vehicle traffic. Widening of the roads at the time of repaving would have little additional effect on project resources, so long as sound construction and sediment and erosion control practices are followed. The improvements at the Rucker Lake walk-in campground would ensure that the facility is safe and in good repair and that recreation demand is met. Development of the Lower Lindsey Creek campground would ensure that additional demand for camping at Lower Lindsey Lake is met over the term of the new license. The addition of a boat-in primitive campground at Lake Spaulding would help to alleviate some of the use pressure at the existing campground and would reduce informal camping along the shoreline with its accompanying effects on shoreline resources.

Therefore, in addition to PG&E's proposed actions, we recommend that PG&E base the number of campsites installed at Lake Sterling on future recreation monitoring, as well as resource protection, and not necessarily limit construction to three campsites; that PG&E base its decision to widen campground roads at the Lake Spaulding campground on recreation monitoring information at the time that the roads are repaved; that PG&E complete the Rucker Lake walk-in campground improvements; that PG&E complete proposed improvements in signage and information measures at Lower Lindsey Lake

campground; and that PG&E install the proposed campsites at Lower Peak Lake. For the proposed new Lake Spaulding boat-in campground, we recommend that PG&E assume full responsibility for installing and maintaining the proposed vault toilet pumping system.

Accessibility Improvements—Currently, a limited number of recreation facilities that are accessible to visitors with disabilities are provided at the project. PG&E is proposing a number of accessibility improvements at the project as part of facility modifications or upgrades. In addition to PG&E's proposed actions, we recommend the addition of one accessible picnic site at the Fuller Lake day-use area and the replacement of the restroom at the Silvertip picnic area and boat launch restroom with an accessible restroom. Constructing accessible recreation facilities would provide improved access to the project's recreational resources.

Signage—Installation and maintenance of well-placed signage is an important component of project recreational facilities. Signs help to inform the public about recreation facility location and use. Signs also help protect project resources by directing users to designated locations, consolidating use in improved areas, and minimizing potential user conflicts. PG&E's proposed Recreation Plan contains numerous provisions for the addition, relocation, modification, and maintenance of signage related to public recreational use of project lands and waters. In addition to PG&E's specific measures for signage, we recommend the addition of signage at the Meadow Lake boat launch and campsites prohibiting OHV use below high water levels.

Recreation Improvement Planning—We recommend that PG&E modify the recreation improvement planning provisions that may affect BLM lands included in the Recreation Plan in several ways: (1) for major recreation site improvements, consult with the Forest Service, BLM, California Fish and Wildlife, and other appropriate federal and state resource agencies during the planning and design phases of construction; (2) also for major recreation site improvements, avoid and protect sensitive resource areas; and (3) consult with BLM, as appropriate, whenever planning or constructing new facilities or undertaking other major project improvements that may affect BLM lands.

Operation and Maintenance—PG&E proposes and the Forest Service specifies provisions for campground hosts in the Recreation Plan. PG&E may provide campground host sites, but the responsibility for project recreation facility operation and maintenance is fully the responsibility of PG&E, and campground hosts may or may not be needed. Therefore, we do not recommend including this requirement in the license. In addition, we recommend that the plan be modified to remove any requirements for PG&E to provide water and septic facilities at designated host campsites. We estimate that upgrading these sites would cost an additional \$36,000 and cannot be justified.

Costs of Managing Project-Related Recreation—We recommend that PG&E modify the Recreation Plan to remove the requirement proposed by PG&E and specified by the Forest Service that PG&E develop a plan to address the costs to the Forest Service for managing project-related recreation, fire management, resource protection, and law enforcement. PG&E is responsible for operating and maintaining project-related recreation facilities. Further, PG&E already provides this funding support to help offset these costs through land use fees and county taxes. If PG&E were to develop a plan to include additional funding to support these activities, the Commission would have no way of ensuring funding provided to the agency for law enforcement would be used for project purposes. Therefore, we do not recommend that PG&E be required to prepare a plan that identifies the cost to the Forest Service for fire management, resource protection, or law enforcement.

In total, our recommended recreation plan would have an estimated levelized annual cost of about \$2,137,000, which is about \$51,000 more than the estimated levelized annual cost of PG&E's proposed recreation plan. We conclude that the benefits of our recommended plan would be worth the cost because

it would: (1) address project effects and provide for project visitor use such as providing project trails and modifying recreation facilities; (2) provide a comprehensive recreation management plan that the Commission can use to determine compliance; (3) protect natural resources at recreation developments; and (4) enhance recreation enjoyment for project visitors.

In addition to our recommendations discussed above, there are provisions that we do not recommend. Although we recommend that PG&E be responsible for operating and maintaining project-related recreation facilities, we do not recommend that PG&E be required to provide funding to the Forest Service for specific recreation-related measures that have been proposed, such as funding the Forest Service up to \$10,000 for vault toilet pumping system installation and operation at the proposed Lake Spaulding boat-in campground. These measures are directly related to project operation and are intended to mitigate for project effects; therefore, it is the responsibility of the licensee. Providing funding to agencies for operating and maintaining the project recreation facilities would not ensure that the facilities are properly operated and maintained. PG&E is ultimately responsible for operation and maintenance of project-related recreation facilities and may choose the means by which these facilities are operated and maintained. Accordingly, we do not recommend that PG&E be required to enter into exclusive funding agreements with Forest Service for these measures.

We also do not recommend certain recreation facility improvement measures specified in Forest Service condition 41, including: the provision of showers at Lake Spaulding Campground; and the specific location of new campsites at Carr Lake on a ridge overlooking the lake. We do not recommend the showers at Lake Spaulding because they are not consistent with the level of facilities generally provided at Forest Service recreation sites. In addition, user surveys found that while some users indicated that they would prefer showers at this site, the majority of visitors found the facilities acceptable. No cost estimate was provided by the Forest Service, but we assume that adding showers at Lake Spaulding Campground as specified by the Forest Service would add to the cost of the campsite improvements. We do not have enough information to estimate the added cost and, therefore, we cannot conclude that adding showers is justified based on a probable additional cost. At Carr Lake, we do not recommend a specific location for the proposed development of the new campsites, because an appropriate location must take into consideration site-specific conditions, as well as the potential cost associated with the development. PG&E has proposed campsite development near the dam. Though no cost estimate was provided by the Forest Service, we assume that campsite development on the ridge overlooking the lake specified by the Forest Service would add to the cost of the campsite development. We do not have enough information to know how far the location specified by the Forest Service is from the proposed campsite locations, and so are not able to estimate the added cost. Therefore, we cannot conclude that developing campsites with a lake view is justified based on a probable additional cost.

We do not recommend certain improvement measures specified in Forest Service condition 41 for trails and trailheads. As discussed in section 3.3.5.2, there are numerous trails in the project area, many of which are non-project trails outside the project boundary. In certain locations, trailheads for these non-project trails are located within the project boundary, even if the trail itself is not a project-related facility. Development of, or major modifications to, existing trailhead facilities that lead to Forest Service trails is not necessary for project purposes and, therefore, they are not considered project facilities. We recommend that PG&E continue to maintain these existing trailhead facilities that lie within the project boundary or are associated with project facilities in a safe and useful condition, but we do not recommend major modifications or enhancements to such facilities, nor do we recommend the construction of new trails that connect Forest Service trailheads to project facilities, if the existing trailhead lies outside the project boundary. Therefore, based on the information available to us, we do not recommend the conversion of campground parking into a trailhead with parking at Rucker Lake because the proposed trailhead would be for a trail that is primarily a non-project trail. We do not recommend the installation of directional signs for trailheads at Lower Lindsey Lake that serve primarily non-project facilities.

Finally, we do not recommend the construction and maintenance at Lower Peak Lake of a non-motorized trail connecting the primitive campsites to the non-project Palisades Trail trailhead.

We do not recommend the inclusion in the proposed recreation plan of a requirement that PG&E cooperate with trail planners on the development and maintenance of the Bear River trail or related trail facilities. The bulk of the Bear River trail would be located outside the project boundary of the Drum-Spaulding Project, primarily on Forest Service lands. Therefore, we conclude that this trail is not necessary for project purposes.

We do not recommend the Forest Service specification for PG&E to improve the Blue Lake dam access road to a maintenance level 3 standard. Although the Blue Lake dam access road is used for recreational access, its primary function is to provide access to the dam. Currently the road is maintained at maintenance level 2, which allows access for high clearance and four-wheel drive vehicles as necessary to access the project facilities. Maintaining the Blue Lake dam access road at maintenance level 3 would allow access for all types of vehicles from passenger cars to large commercial vehicles. Since the primary purpose of this road is to provide access to the dam, maintaining the road at maintenance level 2 would be sufficient to allow access to the project facilities. Though no cost estimate was provided by the Forest Service, we assume that maintaining the road at maintenance level 3 would cost significantly more, and therefore we cannot conclude that a maintenance level 3 is justified based on a probable additional cost.

Finally, we do recommend that PG&E develop additional recreational facilities at Edwards and Purdon Crossing, as specified by BLM condition 6. The Edwards and Purdon Crossing area is located outside the project boundary over 25 miles downstream and does not serve a project purpose nor does it provide access to project facilities. Therefore, given the lack of nexus it would not be appropriate to require PG&E to provide annual funding of \$30,000 for the facilities related to this area.

Recreation Flow Information

Information on recreational flow is needed on a year-round basis to support a growing demand for whitewater boating activities, even during the winter. PG&E proposes to provide streamflow information to the public from May 1 through November 30. We recommend that PG&E provide daily average streamflow information to the public for the five proposed locations on a year-round basis. PG&E is currently providing year-round flow information, and it is appropriate to continue. We estimate the cost of providing year-round flow information to be \$4,000 on a levelized annual basis, which is the same cost as providing the information on a seasonal (May to November) basis.

Fish Stocking Plan

Angling is one of the primary recreational activities associated with the Drum-Spaulding Project. Although natural reproduction occurs in some of the project waters, stocking is necessary to sustain populations of game fish in waters with high angler usage. PG&E proposes to support fish stocking in Lake Spaulding by providing California Fish and Wildlife up to \$15,000 per year. California Fish and Wildlife recommendation 17 recommends a fish stocking program that includes 16 lakes in addition to Lake Spaulding. However, several of California Fish and Wildlife's recommended stocking lakes are remote, have limited access, and limited angler use. We estimate the cost of the California Fish and Wildlife's measures to be about \$77,000.

We note that merely funding California Fish and Wildlife's stocking efforts does not relieve PG&E's responsibility for ensuring that fish stocking at project reservoirs would support current and anticipated future fishing pressure. Further, funding California Fish and Wildlife to continue fish stocking at Lake Spaulding only is insufficient to meet the needs of anglers at other project reservoirs.

We recommend that PG&E prepare and implement a fish stocking plan for the Drum-Spaulding Project. The plan would be developed in consultation with California Fish and Wildlife, the Forest Service, and FWS, and filed for Commission approval. The plan should address stocking in Lake Spaulding, Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, but would also include provisions for stocking fish in additional project reservoirs based on changes in recreational use and angling pressure over the term of the new license. The plan should not include stocking provisions for any reservoirs or project waters where stocking would have to be done aerially, as recommended by California Fish and Wildlife. Aerial stocking of fish at these reservoirs would likely be a significant additional cost. Although California Fish and Wildlife does not provide a cost for aerial stocking, we assume the cost of aerial stocking would be significant, and that aerial stocking is not justified based on current levels of angler use and given that many of the other project reservoirs would be stocked and provide excellent fish opportunities.

A fish stocking plan would benefit project visitors and would be worth the estimated levelized annual cost of \$38,000.

Historic Properties Management Plan

Through implementation of PG&E's final HPMP, most project-related adverse effects would be resolved on historic properties. However, PG&E's HPMP did not address National Register evaluations on eight cultural resource sites, and determine the effects and resolution of effects to any of them determined to be eligible. Therefore, we recommend PG&E incorporate the following measures in its final HPMP in order to ensure that all historic properties within the project's APE are adequately protected : (1) Site P-29-4030—complete the National Register evaluation of lithic scatter component of the site, determine all project-related effects on all aspects of the site, and propose specific management measures to resolve any adverse effects; (2) Sites P-31-4293 and P-31-4375—conduct National Register evaluations, determine effects and potential adverse effects to these sites, and develop measures to reduce adverse effects to these sites, if needed; and (3) Sites P-29-1618, P-31-4362, P-31-4363, P-29-0718, and P-29-1550—in consultation with the SHPO, clarify the National Register eligibility status on these sites and their context in relation to the proposed Spaulding Dam Construction Discontinuous Archeological District. PG&E should also seek concurrence with the SHPO on three built environmental resources they determined as eligible. These resources include the abandoned Old Bear River bridge, Rock Lake trail, and Meadow Vista barn.

Hazardous Substances Plan

As an alternative to Forest Service 4(e) condition 23, BLM 4(e) condition 49, and Reclamation 4(e) condition b.10, PG&E would file a plan approved by Reclamation for oil and hazardous substances storage and spill prevention and cleanup within 1 year of license issuance or prior to undertaking activities on Reclamation lands. However, the alternative condition does not address the potential to spill hazardous substances on all project lands, including Forest Service and/or BLM lands. To meet the regulatory requirements for handling, storage, and emergency response related to hazardous materials, we recommend PG&E's alternative plan and recommend that it apply to all project lands including Forest Service and BLM lands. We further recommend that PG&E consult with the Forest Service and BLM, in addition to Reclamation prior to filing with the Commission within 1 year of license issuance. The implementation of such a plan would ensure that spills of hazardous substances within the project boundary are promptly contained and cleaned up to avoid or minimize the potential extent of environmental effects. We estimate that the annualized cost of developing and implementing a hazardous substances plan would be \$11,000 and conclude the benefits of this measure warrant the costs.

5.1.2.3 Measures Not Recommended by Staff

Some of the measures recommended or specified by relicensing stakeholders would not contribute to the best comprehensive use of the Yuba River and Bear River water resources, do not exhibit sufficient nexus to the project's environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Mercury Bioaccumulation Monitoring

Forest Service condition 35 specifies that PG&E implement a mercury bioaccumulation monitoring program. PG&E's relicensing studies documented high concentrations of methylmercury in fish from project waters. Elevated methylmercury levels in fish tissue have been reported throughout the Sierra Nevada region. PG&E does not propose any substantive changes to reservoir levels or frequency and magnitude of channel modifying flows. Therefore, we do not expect any changes in methylmercury concentration levels in sportfish as a result of project operations. Although the information generated from implementation of this plan would provide appropriate agencies with data on whether or not to issue health advisories for anglers using project waters, bioaccumulation of mercury is not a project-related effect. Consequently, we conclude that the estimated leveled annual cost of \$17,840 for implementation of this plan is not warranted and we do not recommend it.

Bullfrog Eradication

FWS recommended that PG&E develop a bullfrog eradication plan for all project lakes, reservoirs, and impoundment areas to enhance populations of CRLFs, FYLFs, and other frog species. FWS has not provided any specific evidence of how the project contributes to the presence of in the project area.

As discussed in section 3.3.3.2.2, *Wildlife*, development of a bullfrog eradication program for the project would be impracticable and ineffective. Bullfrogs would likely continue to recolonize the project area from adjacent suitable habitats. Further, bullfrog control has generally been restricted to small ponds that can be drained; control of large reservoirs and rivers has not been shown to be practical (Adams and Pearl, 2007).

Although it is difficult to determine the cost of an eradication program, it is likely to exceed \$50,000 per year. We do not believe the benefits would be worth the cost.

Carnivore Management Plan

FWS recommended that PG&E develop a wolverine and fisher management plan to protect these species within designated carnivore management area.

There are no designated wolverine carnivore management area that overlaps the project area. Although Pacific fisher designated carnivore management areas overlap with some of the project areas, the existing populations of Pacific fisher do not overlap with the project boundary. FWS has not provided any evidence of potential project effects to these species. The development of a management plan, as recommended by FWS, would add limited protection to this species due to its lack of use of the available habitat within the project boundary. If issues arise concerning potential project impacts, they can be addressed through the annual consultation meetings. Therefore, we do not recommend development of a carnivore management plan.

Watershed Restoration Plan

California Fish and Wildlife recommends that PG&E develop a watershed restoration plan that describes the slopes below open canals and project facilities by existing erosion condition; describes the methods to resolve slopes that have been and would be damaged by past and future breaches of the open canal system; provides an inspection schedule to identify potential failures that would cause releases of water and subsequent damage to watershed resources; and provides a plan to notify California Fish and Wildlife if damage to watershed resources occurs and to describe the actions that would be taken to repair and restore the damaged site. Forest Service condition 26 and BLM condition 19 specify that PG&E develop a Slope Assessment and Facility Release Access Plan to address erosion potential at discharge points from project facilities including past canal breaches.

PG&E proposes an Erosion Control and Slope Maintenance Plan that includes similar provisions to those recommended by California Fish and Wildlife. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

PG&E provided an alternative condition that would require implementation of the detailed Erosion Control and Slope Maintenance Plan submitted on August 29, 2012. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

PG&E's Erosion Control and Slope Maintenance Plan addresses and integrates all of the primary issues and concerns identified by the Forest Service, BLM, and California Fish and Wildlife under a single comprehensive plan.

Implementation of a watershed restoration measures recommended by California Fish and Wildlife would alleviate existing erosion damage caused by historical canal operations and spills and minimize any future damage resulting from operations under the new license. We conclude, however, that PG&E's Erosion Control and Slope Maintenance Plan contains similar provisions that are adequate to provide slope protection. The estimated annualized cost to integrate California Fish and Wildlife's recommendation with PG&E's Erosion Control and Slope Maintenance Plan is \$180,000 and the improvement of PG&E's plan is not worth this cost.

Protection of Special Status Species

The construction of proposed or future project facilities has the potential to affect special status species and critical habitat. Forest Service condition 12 and BLM condition 33 specify that PG&E submit a biological evaluation prior to construction activities that may affect special status species or critical habitat. California Fish and Wildlife makes a similar recommendation. However, before construction of any new project feature not addressed in this DEIS could occur, PG&E would first need to file with the Commission an application to amend its license. If appropriate, a biological evaluation or, if federally listed species could be involved, a biological assessment for special status species, would be developed as

part of the license amendment proceeding. Consequently, although the intent of this measure would be addressed through the amendment process, we find that there is no need to include this measure as a condition of a new license for this project.

Mormon Ravine Minimum Streamflows and Water Year Type

Reclamation recommends minimum releases to Mormon Ravine at the Newcastle Development between January and May of extreme critically dry, critically dry, and dry water years for maintenance of the cold water pool in Folsom Lake, which is used to meet Reclamation's water temperature compliance limits in the downstream American River. The recommended flows range from 50 to 200 cfs depending on month and water year. Reclamation also recommends a metric for determination of water year type that differs from PG&E's proposal. Reclamation's proposal is based on Sacramento River flows rather than the California DWR Bulletin 120 forecast for the Yuba River applied at all other project minimum flow release locations. December through May is typically the period of peak power generation at the Newcastle Development; historical median monthly flows generally exceed 200 cfs during this period.

Water released to Mormon Ravine at the Newcastle Development is transferred from the upper Yuba River and Bear River basins; therefore, we fail to see the logic in Reclamation's proposal and recommend that the California DWR bulletin 120 forecast for the Yuba River be used for determination of water year type, consistent with all other project-affected reaches. We do not recommend Reclamation's minimum flow proposal because no source of water would be available to meet Reclamation's minimum flows during outages of the upstream canal system that transfer water from the Yuba and Bear Rivers to the Newcastle powerhouse in the American River basin. The cost for implementing the proposed minimum streamflows for Mormon Ravine below the Newcastle Development is included in the estimated cost for implementation of project-wide minimum streamflows.

Recommendations to Support Reintroduction of Spring-run Chinook Salmon and Central Valley Steelhead to the South Yuba River Above Englebright Dam

Actions to reintroduce Central Valley spring Chinook salmon and Central Valley steelhead upstream of the Corps' Daguerre Point and Englebright dams on the Yuba River have been identified in NMFS' Public Draft Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead (Draft Recovery Plan) (NMFS, 2009b). NMFS included a measure in its Biological Opinion (NMFS, 2012) for the operation and maintenance of the Corps of Engineers' Daguerre Point and Englebright dams to reintroduce spring-run Chinook salmon and/or Central Valley steelhead to the upper Yuba River above Englebright dam. NMFS anticipates that reintroduction of these anadromous fish species would take place within the term of a new license issued for the Drum-Spaulding Project.

NMFS provided two environmental recommendations for the Drum-Spaulding Project to support future reintroduction of these two anadromous species in the upper Yuba River including South Yuba River (section 3.3.2.2.2, *Instream Flows*; section 3.3.2.2.8, *Aquatic Biota*). NMFS recommendation 4 for South Yuba River includes 4 subparts. We consider two additional NMFS recommendations to be administrative and do not evaluate them in this draft EIS.

NMFS intention is for these recommendations to be implemented at a future time should steelhead and/or Chinook salmon be reintroduced into upper Yuba River areas influenced by the project. NMFS recommends that the Drum-Spaulding Project operate under the new license in a manner consistent with the Biological Opinion.

This Biological Opinion for Daguerre Point and Englebright dams is undergoing revision at this time, and no specific schedule for the reintroduction of these species has been suggested. We note that

there are considerable uncertainties regarding the viability and implementation program set forth in the draft recovery plan (NMFS, 2009a) and the Central Valley Project and State Water Project biological opinion (NMFS, 2009b). NMFS (2009b) states that the concept of collection of outmigrating juveniles at facilities at the head of reservoirs to ensure safe and timely downstream passage of juvenile and post-spawn steelhead is untested, and multiple concepts may need to be tested simultaneously. To our knowledge, no federal funding for any or all of these tasks has been proposed. Thus, the implementation of a long-term reintroduction program for either species, particularly in the upper Yuba River, is, at best, uncertain and NMFS recommendations are premature.

Paleontological Resources

Forest Service 4(e) condition 43, BLM 4(e) condition 21, and Reclamation condition b.11 specify that paleontological resources should be included in the HPMP. PG&E has not included management measures for paleontological resources in the HPMP. Paleontological resources are not cultural resources and, thus, are not eligible for listing on the National Register and cannot be addressed in the HPMP pursuant to section 106. The Commission has no jurisdiction over PG&E to enforce these 4(e) conditions to protect paleontological resources. Paleontological resources are protected by California statute (e.g., Public Resources Code Section 5097.5 (a), Removal or Destruction; Prohibition), appendix G to the CEQA Guidelines that was revised in 2009 to include an assessment of project effects on paleontological resources, and the Paleontological Resources Preservation Act (P.L. 111-011) Omnibus Public Land Management Act of 2009 Subtitle D--Paleontological Resources Preservation. It is the responsibility of the federal land manager to carry out such protective measures. In the case of a new license for the project, PG&E would be responsible for consulting with the Forest Service and BLM under these circumstances.

Inadvertent Discoveries

Forest Service 4(e) condition 43, BLM 4(e) condition 21, and Reclamation condition b.11 also state that when inadvertent discoveries are found on Forest Service, BLM, or California Fish and Wildlife lands, PG&E would not resume work on ground-disturbing activities until written approval from the Forest Service or BLM is received. PG&E has plans for handling inadvertent discoveries in the HPMP that do not require it to receive written approval from the Forest Service or BLM to proceed following a discovery. These plans have been reviewed and commented on by the Forest Service, BLM, and tribes. PG&E's alternative 4(e) condition for noticing, consulting, and documenting cultural resources involving inadvertent discoveries would adequately protect historic properties from project-related effects. Therefore, we conclude that the process PG&E has already provided in its HPMP is appropriate.

5.1.3 Unavoidable Adverse Impacts

The continued operation of the Drum-Spaulding Project would result in some minor unavoidable adverse effects on geologic, soil, aquatic, terrestrial, and visual resources. The geologic and soil resource effects could include some minor continued erosion associated with project operation and renovation of recreational facilities and interruption of sediment transport at project reservoirs. Most of these effects would be reduced by the proposed resources enhancement measures, including: (1) implementation of the Erosion and Sediment Control Management Plan; and (2) development and implementation of an LWD management plan.

Aquatic communities have developed and adapted to the high level of natural flow variability in western Sierra streams. Reduced flow variability as a result of historical project operations could have resulted in shifts in community composition, diversity, and resilience. Proposed minimum flow and spill cessation measures would improve seasonal and inter-annual flow variability to better mimic natural flow variability in some project affected reaches; however, inter-basin transfer of water via project facilities to

meet water delivery commitments and contracts under legally established water rights would continue to reduce overall natural flow and variability in many project reaches.

Discharges from project canals augment natural flow in some project reaches (e.g., Bear River, Auburn Ravine, and Mormon Ravine). When these canals are taken out of service for maintenance or in the event of an emergency and flow ceases, flow in these reaches returns to natural flow levels, which could be zero flow at some locations during some months. In other reaches, canal outages can result in spills of atypical magnitude through the reach. Proposed measures would reduce, but not eliminate the outage-associated flow shifts.

Some fish entrained into project conduits, canals, and flumes are subject to stress, injury, and mortality when flow ceases during outages. Proposed fish protection and rescue measures have been designed to reduce potential mortality during these periods. Some minor levels of mortality would still be likely to occur associated with capture, handling, and transport of fish collected in open canal structures or in closed conduits and tunnels where fish rescue protocols cannot be safely implemented.

For terrestrial resources, unavoidable adverse effects could include loss of vegetation and wildlife habitat from the construction of new or rehabilitated recreation facilities that require permanent removal of vegetation and from project maintenance. Effects to vegetation and wildlife habitat would be reduced by implementation of the Integrated Vegetation Management Plan.

Some mortality of target wildlife species would continue to occur in project related components (e.g., canals and flumes). Wildlife protection measures have been proposed to monitor and reduce wildlife mortality due to these components. Wildlife crossing measures have been proposed in canals with relatively high levels of target wildlife species mortality to minimize adverse impacts. Some minor levels of target wildlife species mortality would continue to occur in project structures.

5.1.4 Summary of 10(j) Recommendations and 4(e) Conditions

5.1.4.1 Fish and Wildlife Agency Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: NMFS (letter filed July 31, 2012) and California Fish and Wildlife (letter filed July 30, 2012).

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. Table 5-2 lists the federal and state recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Of the 71 recommendations and associated subparts submitted by California Fish and Wildlife, we consider 30 to be within the scope of section 10(j). The General Measures include 2 subparts, Flow Measures include 10 subparts, and Terrestrial Protection Measures include 12 subparts. Of the 30 recommendations within the scope of section 10(j), we wholly include 21, modify 7, and do not include 2. We discuss the reasons for not including those recommendations in section 5.1.2, *Comprehensive*

Development and Recommended Alternative. Table 5-2 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). Of the 45 recommendations that are not within the scope of section 10(j), 29 are administrative recommendations, identical to some of the Forest Service's 4(e) administrative conditions; the other 18 are considered 10(a) recommendations. Of the administrative conditions, we only address the following recommendations in our draft EIS: condition 1: *Consultation*, condition 12: *Protection of Forest Service Special Status Species*, condition 16: *Pesticide Use Restrictions on NFS Lands*, condition 23: *Hazardous Substances Plan*, condition 27: *Slope Stability and Facility Release Access Plan*, and condition 28: *Watershed Restoration Plan*.

NMFS submitted one recommendation that is within the scope of section 10(j) to support anadromous salmonids present in three western Placer County streams. NMFS also submitted seven recommendations concerning future reintroduction of spring-run Chinook salmon and/or Central Valley steelhead in the South Yuba River upstream of Englebright dam. These recommendations do not fall within the scope of section 10(j) because they depend upon a future action. We do not recommend adoption of any of these eight recommendations. NMFS also filed two recommendations with regard to consistency with the biological opinion on Corps of Engineers actions and formal consultation under the ESA (recommendations 1 and 2) that we consider administrative and are not addressed in our draft EIS.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
1	Consultation.	California Fish and Wildlife (recommendation 1)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$30,000	Yes
2	Annual employee training.	California Fish and Wildlife (recommendation 1.1)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$60,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
3	Coordinated operations plan.	California Fish and Wildlife (recommendation 1.2)	Yes	\$21,000	Yes
4	Determine Water Year Type in February, March, April, May, and October of each year based on unimpaired runoff in Yuba River at Smartsville as set in California DWR Bulletin 120.	California Fish and Wildlife (recommendation 2.1)	Yes.	\$10,000	Yes
5	Higher Minimum Streamflows in 11 project-affected reaches, new minimum streamflows in 16 project-affected reaches with no existing minimum flows, and the same minimum streamflows in 2 project-affected reaches.	California Fish and Wildlife (recommendation 2.2 and 2.4)	Yes	\$3,252,000	Yes
6	Drum-Spaulding compliance with minimum streamflow requirements in Bear River below Bear River canal diversion dam at gage YB-196.	California Fish and Wildlife (recommendation 2.3)	Yes	\$5,000	Yes, staff recommends Drum-Spaulding Project coordinate with Yuba-Bear Project operations to ensure compliance with minimum streamflows at gage YB-196 in the Bear River below the Bear River canal diversion dam by limiting diversion to the Bear River canal as necessary.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
7	Canal Outage—Notify licensing participants at the annual consultation meeting of all annual planned and non-routine planned canal outages. Provide required minimum instream flow or inflow, whichever is less. For canal outages expected to extend past 30 days consult with agencies and notify the Commission of any modifications to minimum streamflows agreed on for the outage period. Notify agencies within one business day in event of emergency outage. Do not take Drum and Bear River canals out at the same time.	California Fish and Wildlife (recommendation 2.5)	Yes	\$5,000	Yes
8	Fordyce Lake Drawdown—Manage discharge from Fordyce Lake after spills cease at Fordyce Lake and Lake Spaulding. The high target flow (475-250 cfs) from Fordyce Lake should not cause additional spill from Lake Spaulding. End of year carryover storage at Fordyce Lake would be 7,500 to 10,000 acre-feet. Releases would be apportioned between 29,000 and 10,000 acre-feet. A 10-day special event flow of 50 cfs would begin in the third week of August.	California Fish and Wildlife (recommendation 2.6)	Yes	\$5,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
9	Flow Releases to Bear River below Drum canal at YB-137—Construct and operate two flow release devices near Drum canal spillway, releasing 1 cfs in extremely critically dry and critically dry water years and 2 cfs in all other water years.	California Fish and Wildlife (recommendation 2.7)	Yes	\$15,000	Yes
10	Spill Cessation and Minimization of Flow Fluctuations in South Yuba River—Implement a spill cessation schedule at Lake Spaulding dam to minimize rapid flow reduction and fluctuation in the South Yuba River downstream.	California Fish and Wildlife (recommendation 2.8)	Yes	\$53,000	Yes
11	Block Flows for Management of Water Temperature in South Yuba River—Release up to an additional 2,500 acre-feet of water to the South Yuba River below Lake Spaulding dam between June 15 and September 15 in all water year types except extremely critically dry water years to maintain water temperatures below 19°C.	California Fish and Wildlife (recommendation 2.9)	Yes	\$160,000	No, the objectives of this recommendation would be accomplished by the Forest Service Supplemental Flow condition (29) recommended by staff.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
12	Establish an Ecological Group to assist with the implementation of license measures and the monitoring plan.	California Fish and Wildlife (recommendation 2.10)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$61,000	Yes, except this group would only monitor the implementation of the adopted Supplemental Flow condition (Forest Service condition 29). Otherwise, the terms of this recommendation would be fulfilled through the annual consultation process.
13	Develop Canal Outages Fish Rescue Plan.	California Fish and Wildlife (recommendation 3)	Yes	\$30,000	Yes
14	Gaging Plan—Develop a gaging plan to measure streamflow compliance for each of the reaches with a minimum streamflow requirement.	California Fish and Wildlife (recommendation 4)	Yes	\$268,000	Yes
15	Develop an aquatic invasive species management plan to address aquatic invasive species such as New Zealand mudsnail, Quagga mussels, and zebra mussels.	California Fish and Wildlife (recommendation 6)	Yes	\$20,000	Yes, we recommend implementation of PG&E's Integrated Vegetation Management Plan August 29, 2012, which addresses aquatic invasive species.
16	Implement an integrated vegetation and non-native invasive species management plan.	California Fish and Wildlife (recommendation 7.1)	Yes	\$93,000	Yes, we recommend implementation of PG&E Integrated Vegetation Management Plan filed on August 20, 2012.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
17	Monitor animal losses in all project canals, including recording details of each animal mortality occurrence.	California Fish and Wildlife (recommendation 7.2)	Yes	\$10,000	Yes
18	Develop a wildlife crossing plan for the Drum, South Yuba, and Towle canals; build wildlife crossing structures in the canals according to minimum specifications.	California Fish and Wildlife (recommendation 7.3)	Yes	\$76,000	Yes, partially adopt. We recommend PG&E's alternative condition that provides specific locations for constructing or retrofitting wildlife crossings but with narrower and less frequent wildlife crossings. We do recommend measures at Towle canal of Chalk Bluff canal segment of South Yuba canal.
19	Develop a wildlife crossing plan for the Bear and South canals; build wildlife crossing structures in the canals according to minimum specifications.	California Fish and Wildlife (recommendation 7.4)	Yes	\$143,000	Yes, but recommend a wildlife crossing plan with narrower and less frequent wildlife crossings.
20	Consult with California Fish and Wildlife when replacing wildlife escape and wildlife crossing facilities regarding specifications and design.	California Fish and Wildlife (recommendation 7.5)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$4,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
21	Bear River management through Bear Valley including upper Bear River studies to evaluate geomorphic conditions. Monitor fixed transect cross-sections, substrate, vegetation, and erosion/bank instability sites.	California Fish and Wildlife (recommendation 7.6)	Yes	\$66,000	Yes, but adopt Forest Service condition 34, Bear River Management Plan in Bear River above Drum afterbay, which includes more detail for qualitative and quantitative baseline and ongoing monitoring of channel and riparian geomorphic and erosion conditions and recommendations for mitigation, as necessary.
22	Bear River management through Bear Valley interim Bear River flow management, and Drum canal operations. Manage flow in the Bear River for winter and planned outage spills from Drum canal to reduce the magnitude of spill flows in the Bear Valley Meadow.	California Fish and Wildlife (recommendation 7.6)	Yes	\$326,000	Yes, but use more clearly defined conditions proposed by the Forest Service and PG&E.
23	Implement Bald Eagle Management Plan.	California Fish and Wildlife (recommendation 7.7)	Yes	\$10,000	Yes, we recommend implementation of PG&E's Bald Eagle Management Plan filed on June 18, 2012.
24	Submit a biological evaluation, for approval by appropriate agencies, prior to construction activities on Forest Service or BLM lands that may affect special status species or critical habitat.	California Fish and Wildlife (recommendation 7.8 and 12)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. Biological evaluation is already required prior to new construction.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
25	Annually review current lists of special status species that might occur in project area and that may be affected by project operations, and suggested procedure to follow if special status species is detected.	California Fish and Wildlife (recommendation 7.9)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$16,000	Yes
26	Use raptor-safe powerline design and configurations for new powerlines or when replacing existing structures. Replace or retrofit powerlines with substantial raptor-powerline interaction issues. Conduct evaluation of power poles to determine consistency with Avian Protection on Power Lines and replace or retrofit non-compliant poles.	California Fish and Wildlife (recommendation 7.10)	Yes	\$66,000 (use raptor-safe design and retrofit problem lines); \$7,000 (evaluate lines); unknown (correct non-compliant poles)	Yes, but with exception of evaluation of existing power poles and requirement to correct non-compliant poles.
27	Annually record all incidental observations and details of bird collision/electrocutions at project transmission lines.	California Fish and Wildlife (recommendation 7.11)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$7,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
28	Document all bat roosts within project buildings, dams, or other structure that may be used as roosting structure; place humane exclusion devices in structure with bats present; perform annual inspection of exclusion devices and structures.	California Fish and Wildlife (recommendation 7.12)	Yes	\$3,000	Yes
29	Develop and implement a monitoring plan that would assess the response of large stream, riverine, and upper elevation species to changes in streamflow and temperature. Establish a monitoring program for aquatic species, non-native invasive species, sensitive species, recreation, bear management, and sensitive raptor species.	California Fish and Wildlife (recommendation 8)	Yes	\$293,000	Yes, we recommend PG&E's Aquatic Monitoring Plan filed on August 29, 2012 for aquatic species, including foothill yellow-legged frog and western pond turtle, and note that other monitoring is included in resource-specific plans.
30	Develop and implement an LWD management plan.	California Fish and Wildlife (recommendation 9)	Yes	\$58,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
31	Schedule and facilitate a review meeting when the maintenance schedule, water year forecast, and reservoir level forecasts are finalized to discuss the implementation of streamflow and reservoir related conditions, results of monitoring, and other issues related to preserving and protection ecological values.	California Fish and Wildlife (recommendation 10)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$15,000	Yes, however, we suggest that this consultation would be accomplished during the annual consultation meeting.
32	Develop and implement a plan to evaluate the penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when release points are used.	California Fish and Wildlife (recommendation 11)	Yes	\$73,000	Yes, elements of this recommendation are included under Forest Service condition 26, Slope Assessment and Facility Release Access Plan.
33	Recreation Survey, Monitoring, and Future Development Triggers	California Fish and Wildlife (recommendation 12)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in the cost for the Recreation (California Fish and Wildlife measure 16)	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
34	Annual Recreation Coordination Meeting: Each year during the term of the license, arrange to meet with interested agencies for an annual coordination meeting to discuss the measures needed to ensure public safety, and protection and use of recreation facilities.	California Fish and Wildlife (recommendation 15)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in the cost for the Recreation (California Fish and Wildlife measure 16)	Yes
35	Upon issuance of the license, implement the Recreation Plan as approved by the Commission. Recommendation includes site-specific recommendations for recreation facility modifications and improvements.	California Fish and Wildlife (recommendation 16)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$2,112,800	Yes, we recommend implementation of PG&E's revised Recreation Plan filed on August 29, 2012, as modified by staff.
36	Restrict pesticide use on federal lands without prior written approval of appropriate agencies; includes details and restriction on allowed pesticides.	California Fish and Wildlife (recommendation 16)	Yes	\$0	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
37	Recreation fish stocking: recommends numbers of fingerlings and catchable fish to be stocked; recommends stocking in 16 reservoirs in addition to Lake Spaulding; includes annual consultation with California Fish and Wildlife to obtain fish stocking targets, fish species, discuss fish acquisition, and verify the completion of the previous year's stocking commitment. At PG&E's discretion, either: (1) acquire the fish directly from fish hatcheries approved by California Fish and Wildlife, or (2) reimburse California Fish and Wildlife, to the extent California Fish and Wildlife has fish available, for the cost of the stocking program at the reservoirs listed above.	California Fish and Wildlife (recommendation 17)	Yes	\$231,000	Yes, but modified to develop a fish stocking plan that includes stocking in Lake Spaulding, Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake, and would also include provisions for stocking fish in additional project reservoirs based on changes in recreational use and angling pressure over the term of the new license. PG&E would be responsible for ensuring that stocking is carried out under the fish stocking plan.
38	Develop and implement an Erosion and Sediment Control and Management Plan	California Fish and Wildlife (recommendation 22)	Yes	\$400,000	Yes, we recommend implementation of PG&E's Erosion Control and Slope Maintenance Plan filed on August 29, 2012.
39	Hazardous Substances Plan	California Fish and Wildlife (recommendation 23)	Yes	\$11,000	Yes

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
40	Develop and implement a Slope Stability Plan.	California Fish and Wildlife (recommendation 27)	Yes	\$400,000	Yes, we recommend implementation of PG&E's Erosion Control and Slope Maintenance Plan filed on August 29, 2012.
41	Develop and implement a Watershed Restoration Plan	California Fish and Wildlife (recommendation 28)	Yes	\$180,000	No, but PG&E's Erosion Control and Slope Maintenance Plan filed on August 29, 2012 addresses major issues.
42	Implement minimum flows below Bowman Lake (15-75 cfs) and Lake Spaulding (25-75 cfs) to maintain 19°C 7-day mean water temperature at the Poorman Creek confluence with the South Yuba River.	NMFS (recommendation 4.1)	No, because it depends upon a future action.	\$200,000	No, recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur
43	Install additional streamflow and temperature gaging instruments in the South Yuba River at the confluence of Poorman Creek.	NMFS (recommendation 4.1)	No, because it depends upon a future action.	\$340,000	No, recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
44	Develop and implement an LWD Management Plan for South Yuba River at Lake Spaulding dam for implementation when anadromous species are reintroduced above Englebright dam.	NMFS (recommendation 4.2.1)	No, because it depends upon a future action.		No, recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
45	Develop and implement an interim LWD measure for anadromous fish to allow passage/ placement of LWD trapped in Lake Spaulding to South Yuba River below Lake Spaulding dam. Deliver 30 cubic meters of LWD per year to the South Yuba River below Canyon Creek.	NMFS (recom-mendation 4.2.2)	No, because it depends upon a future action.	\$80,000	No, recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur. Forest Service condition 36 includes survey of LWD conditions and would addresses movement of LWD downstream of Lake Spaulding through development and implementation of a specific LWD plan, if necessary.
46	Develop and implement a coarse substrate management plan for the South Yuba River. The plan should quantify the volume of sediment and grain size behind dams and in anadromous reaches, the percent of sediment available for spawning, and an inflow-outflow sediment budget.	NMFS (recom-mendation 4.3)	No, because it depends upon a future action.	\$70,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
47	Develop and implement an adaptive management plan for the prospective reintroduction of Chinook and steelhead salmon.	NMFS (recom-mendation 4.4)	No, because it depends upon a future action.	\$29,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.

Table 5-2. Fish and wildlife agency recommendations for the Drum-Spaulding Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
48	Implement minimum flows below Bowman Lake (25-50 cfs) and Lake Spaulding (15-30 cfs) for central valley steelhead in the absence of Chinook salmon reintroduction. Maintain 20°C 7-day mean water temperature at the Poorman Creek confluence with the South Yuba River.	NMFS (recommendation 6.1)	No, because it depends upon a future action.	\$200,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
49	Implement minimum flows of 6 cfs in Auburn Ravine, 1 cfs in Rock Creek, and 1 cfs in Dry Creek.	NMFS (recommendation 7.1)	Yes	\$105,000	No, direct effects of project operations on flows and aquatic habitat in Dry Creek and Rock Creek extend a short distance downstream. Designated critical habitat for Central Valley steelhead is located about 6-8 miles farther downstream in Coon Creek below Lower Falls. In Auburn Ravine, the upstream extent of designated critical habitat for steelhead is RM 26.6. Steelhead do not access the upper 2.8 miles of designated critical habitat above non-project Auburn Ravine 1 diversion dam, a barrier to migration at RM 23.8.

5.1.4.2 Land Management 4(e) Conditions

In section 2.2.4, *Modifications to Applicants' Proposals—Mandatory Conditions*, we list the 4(e) conditions submitted by the Forest Service, BLM, and Reclamation, and we note that section 4(e) of the FPA provides that any license issued by the Commission “for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management

agency deems necessary for the adequate protection and use of the reservation.” Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our staff alternative.

Of the Forest Service’s 46 section 4(e) conditions, we consider 23 of the conditions (conditions 2 through 11, 13, 14, 15, 17 through 22, 24, 25, 32, and 46) to be administrative or legal in nature and not specific environmental measures. Of BLM’s 50 section 4(e) conditions, we consider 23 (conditions 8, 24 through 32, 34, 35, 36, and 38 through 47) to be administrative or legal in nature and not specific environmental measures. Of Reclamation’s 15 section 4(e) conditions, we consider 11 (conditions A, b.2 through b.8, and b.12, b.13, and b.14) to be administrative or legal in nature and not specific environmental measures. We do not analyze these administrative conditions in this draft EIS. Table 5-3 summarizes our conclusions with respect to the 54 preliminary 4(e) conditions that we consider to be environmental measures. We include wholly in the staff alternative 19 Forest Service conditions, 22 BLM conditions, and 4 Reclamation conditions as specified by the agencies. We modify Terrestrial Protection condition from the Forest Service and BLM. We do not recommend three Forest Service conditions, four BLM conditions, and one Reclamation condition; the measures not adopted in total are discussed in more detail in section 5.1.2, *Comprehensive Development and Recommended Alternative*.

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulding Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
1	Consultation	Forest Service	\$30,000	Yes
12	Protection of Forest Service Special Status Species (also included in condition 34)	Forest Service	\$0	No, a biological evaluation will be considered during any project construction activity. No additional condition is necessary
16	Pesticide-Use Restrictions on National Forest System Lands	Forest Service	\$0	Yes
23	Hazardous Substances Plan	Forest Service	\$11,000	Yes
26	Slope Assessment and Facility Release Access Plan	Forest Service	\$400,000	Yes, we recommend implementation of PG&E’s Erosion Control and Slope Maintenance Plan filed on August 29, 2012.

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
27	Erosion and Sediment Control and Management	Forest Service	\$400,000	Yes, we recommend implementation of PG&E's Erosion Control and Slope Maintenance Plan filed on August 29, 2012.
28	Annual employee training	Forest Service	\$60,000	Yes
28	Coordinated operations plan	Forest Service	\$21,000	Yes
29	Water year type	Forest Service	\$10,000	Yes
29	Minimum streamflows for 6 project-affected stream reaches	Forest Service	\$2,950,000	Yes
29	Flow setting for 16 remote access dam outlet works	Forest Service	\$302,000	Yes
29	Canal outages affecting 2 stream reaches	Forest Service	\$5,000	Yes
29	Fordyce Lake drawdown	Forest Service	\$5,000	Yes
29	Spill cessation and minimization of flow fluctuation at the South Yuba River below Lake Spaulding dam	Forest Service	\$53,000	Yes
29	South Yuba River Supplemental Flows	Forest Service	\$149,000	Yes
29	Ecological group	Forest Service	\$61,000	Yes, except this group would only monitor the implementation of the adopted South Yuba River Supplemental Flow condition (29). Otherwise, the terms of this recommendation would be fulfilled through the annual consultation process.

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-SpaULDing Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
30	Canal outages fish rescue plan	Forest Service	\$30,000	Yes
31	Gaging plan	Forest Service	\$268,000	Yes
33	Aquatic invasive species management	Forest Service	\$20,000	Yes
34	Terrestrial Protective Measure: Vegetation and Non-Native Invasive Plant Management Plan	Forest Service	\$93,000	Yes, we recommend implementation of PG&E's Integrated Vegetation Management Plan filed on August 20, 2012.
34	Terrestrial Protective Measure: Monitor Animal Losses in Project Canals	Forest Service	\$10,000	Yes
34	Terrestrial Protective Measure: Replacement of Wildlife Escape and Wildlife Crossing Facilities	Forest Service	\$4,000	Yes
34	Terrestrial Protective Measure: Wildlife Crossings — Drum, South Yuba, and Towle Canals	Forest Service	\$51,000	No, adopt PG&E's alternative condition that provides specific locations for constructing or retrofitting wildlife crossings but with narrower and less frequent wildlife crossings and excludes Towle canal.
34	Terrestrial Protective Measure: Wildlife Crossings — Bear and South Canals	Forest Service	\$103,000	No, recommend a wildlife crossing plan with narrower and less frequent wildlife crossings.

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
34	Terrestrial Protective Measures: Bald Eagle Management Plan	Forest Service	\$10,000	Yes, we recommend implementation of PG&E's Bald Eagle Management filed on June 18, 2012.
34	Terrestrial Protective Measures: Special Status Species (same as condition 12)	Forest Service	\$0	No, a biological evaluation will be considered during any project construction activity. No additional condition is necessary
34	Terrestrial Protective Measures: Annual Review of Special Status Species Lists and Assessment of New Species on Federal Land	Forest Service	\$16,000	Yes
34	Terrestrial Protective Measures: Project Powerlines	Forest Service	\$66,000	Yes
34	Terrestrial Protective Measures: Raptor Collisions	Forest Service	\$7,000	Yes
34	Terrestrial Protective Measures: Bat Management	Forest Service	\$3,000	Yes
34	Terrestrial Protective Measures: Bear River Management Plan in Bear River Above Drum Afterbay on National Forest System Land	Forest Service	\$66,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
35	Monitoring Program	Forest Service	\$293,000	Yes, we recommend implementation of PG&E's Aquatic Monitoring Plan filed on August 29, 2012 for aquatic species, including foothill yellow-legged frog and western pond turtle, and note that other monitoring is included in resource-specific plans.
36	Large woody debris management plan	Forest Service	\$58,000	Yes, but modify scope of stream reaches to be surveyed based on dam and watershed characteristics for generating and passing LWD to downstream reaches.
37	Recreation Survey, Monitoring, and Future Development Triggers	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
38	License Contact	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
39	Review of Recreation Development	Forest Service	Included in the cost for the Recreation (Forest Service condition 41)Plan	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
40	Annual Recreation Coordination Meeting	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
41	Recreation Plan - Finalize a Recreation Plan and submit for Forest Service approval.	Forest Service	\$2,137,000	Yes, we recommend implementation of PG&E's revised Recreation Plan filed on August 29, 2012, as modified by staff.
42	Visual Resource Management Plan	Forest Service	\$3,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
43	Finalize HPMP within 1 year after license issuance. During ground disturbance, notify the Forest Service of any discovery involving cultural resources or paleontological resources and not resume work on ground disturbing activities until receipt of written notice from the Forest Service.	Forest Service	\$963,000	Yes, but recommend PG&E implement the final HPMP filed on October 1, 2012 with modifications involving eight cultural resource sites that need to be evaluated and protected/mitigated from project-related effects. Also, adopt PG&E's alternative 4(e) condition involving treatment of inadvertent discoveries that is already in the HPMP but does not include paleontological resources or receipt of written notice to proceed.
44	Transportation Management Plan	Forest Service	\$806,000	Yes
45	Fire Management and Response Plan	Forest Service	\$2,000	Yes
Not numbered	Project boundary adjustments	Forest Service	\$10,000	Yes
1	Annual employee training	BLM	\$60,000	Yes
2	Coordinated operations plan	BLM	\$21,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulding Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
3	Coordination of the Drum-Spaulding and Yuba-Bear Projects Operations Regarding the Yuba-Bear Project Minimum Streamflows in the Bear River Below Rollins Reservoir at NID YB-196 Gage	BLM	\$5,000	Yes
4	Canal Outages	BLM	\$46,000	Yes
5	Canal outages fish rescue plan	BLM	\$30,000	Yes
6	Recreation Agreement	BLM	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
7	Ecological Group	BLM	\$61,000	Yes, except modified to focus on monitoring implementation of the supplemental flow condition. Otherwise, the terms of this recommendation would be fulfilled through the annual consultation process.
9	Gaging Plan	BLM	\$268,000	Yes
10	Wildlife Crossings – Bear River and Drum (Chalk Bluff) Canals	BLM	\$103,000	No, adopt PG&E's alternative condition that provides narrower and less frequent wildlife crossings and excludes Chalk Bluff canal.
11	Replacement of Wildlife Escape and Wildlife Crossing Facilities	BLM	\$4,000	Yes
12	Monitor Animal Losses in Project Canals	BLM	\$10,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
13	Special Status Species (same as condition 33)	BLM	\$0	No, a biological evaluation would be considered during any project construction activity. No additional condition is necessary.
14	Annual-Review of Special Status Species Lists and Assessment of New Species on Federal Land	BLM	\$16,000	Yes
15	Project Powerlines and Raptor Collisions	BLM	\$66,000 (use raptor-safe design and retrofit problem lines); \$7,000 (record raptors mortality)	Yes
16	Bald Eagle Management Plan	BLM	\$10,000	Yes, we recommend implementation of PG&E's Bald Eagle Management filed on June 18, 2012.
17	Terrestrial Protective Measure: Vegetation and Non-Native Invasive Plant Management Plan	BLM	\$93,000	Yes, we recommend implementation of PG&E's Integrated Vegetation Management Plan filed on August 20, 2012.
18	Fire Management and Response Plan	BLM	\$2,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
19	Slope Assessment and Facility Release Point Plan	BLM	\$400,000	Yes, but implement PG&E's Erosion Control and Slope Maintenance Plan submitted on August 29, 2012.
20	Visual Resource Management Plan	BLM	\$3,000	Yes
21	Finalize HPMP within 1 Year after License Issuance. During ground disturbance, notify BLM of any discovery involving cultural resources or paleontological resources and not resume work on ground disturbing activities until receipt of written notice from the BLM.	BLM	\$963,000	Yes, but recommend PG&E implement the final HPMP filed on October 1, 2012 with modifications involving eight cultural resource sites that need to be evaluated and protected/mitigated from project-related effects. Also, adopt PG&E's alternative 4(e) condition involving treatment of inadvertent discoveries that is already in the HPMP but does not include paleontological resources or receipt of written notice to proceed.
22	Transportation Management Plan	BLM	\$806,000	Yes
23	Consultation	BLM	\$30,000	Yes

Table 5-3. Forest Service, BLM, and Reclamation 4(e) conditions for the Drum-Spaulling Project.
(Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
33	Protection of BLM Special Status Species (same as condition 13)	BLM	\$0	No, a biological evaluation will be considered during any project construction activity. No additional condition is necessary.
37	Pesticide-Use Restrictions on BLM Lands	BLM	\$0	Yes
48	Licensee Contact	BLM	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
49	Hazardous Substances Plan	BLM	\$11,000	Yes
50	Erosion and Sediment Control and Management	BLM	\$400,000	Yes, we recommend implementation of PG&E's Erosion Control and Slope Maintenance Plan filed on August 29, 2012.
b.1	Consultation	Reclamation	\$30,000	Yes
b.9	Pesticide-Use Restrictions on Reclamation Lands	Reclamation	\$10,000 Annual O&M Cost	Yes.
b.10	Hazardous Materials	Reclamation	\$11,000	Yes
b.11	Discovery of Cultural Resources	Reclamation	\$61,000	Yes, but without treatment of paleontological resources.

5.2 YUBA-BEAR PROJECT

5.2.1 Comparison of Proposed Project and Alternatives

In this section, we compare the developmental and non-developmental effects of NID's proposal, NID's proposal as modified by staff (staff alternative), and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the generation would be 236,000 MWh for the proposed action; 236,000 MWh for the staff alternative; and 266,000 MWh for the no-action alternative.

We summarize the environmental effects of the different alternatives in table 5-4.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Generation	266.0 GWh	236.0 GWh	236.0 GWh
Geology and Soils	Rollins upgrade would not be implemented.	Development and implementation of a Rollins upgrade construction erosion control and restoration plan would minimize erosion and sedimentation from construction activities.	Same as proposed action.
	Standard construction BMPs would be implemented on a site by site basis and would minimize ongoing erosion and sedimentation.	Development and implementation of a recreation facilities construction erosion control and restoration plan would minimize erosion and sedimentation from construction activities.	Same as proposed action.
	Eroded condition of Clear and Trap Creeks would continue to deteriorate.	Implementation Clear and Trap Creeks Channel Stabilization would help protect eroded banks.	Same as proposed action.
	Eroded spill channels below project structures would remain in current condition.	Implementation of an Erosion Control and Slope Maintenance Plan would minimize ongoing erosion at spill channels.	Same as proposed action.
Aquatic Resources	Existing minimum streamflows vary with normal and dry water year types providing less streamflow variability and flexibility typical of regulated streams with limited aquatic habitat and fish production.	Water Year Type – Minimum streamflow requirements dependent on six different water year types: extremely critically dry; critically dry; dry; below normal; above normal; and wet.	Same as proposed action with the modification that extreme critically dry water year type minimum streamflows be implemented in the second year of two sequential critically dry years.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Provide existing minimum streamflows in 7 stream reaches. No minimum streamflows required in 10 project affected stream reaches, providing no aquatic habitat.	Minimum Streamflows – Provide same or higher minimum streamflows in 6 project-affected reaches, new minimum streamflows in 9 project-affected reaches that do not have existing minimum streamflows. Two stream reaches would have no specific minimum streamflow requirement. The higher streamflows would increase fish habitat for all resident fish species.	Same as proposed action.
	No seasonal adjustment to flows in these reaches to enhance storage when late summer and fall weather conditions are indicative of a period of dry weather has potential to result in non-compliance with minimum flow requirement and result in adverse effect on aquatic habitat.	Minimum Stream flow, Flow Setting and Winter Flow Adjustment – Implement adjusted minimum streamflows in the Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam from November to January and below Wilson Creek diversion dam from November 1 to the earliest date to safely access the facility.	Same as proposed action.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Flows in Bear River below Chicago Park powerhouse decrease sharply at the beginning of an outage at Chicago Park with the potential for stranding aquatic organisms.	Chicago Park Motoring during outage to maintain minimum streamflows – From May 1 through September 15, avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park powerhouse in a synchronous condense mode when the unit is not generating electricity. During non-routine planned outages that would cause Dutch Flat afterbay to spill, make a good faith effort to motor the powerhouse until the flows from the Dutch Flat afterbay spill reach the tailrace of Chicago Park powerhouse.	Same as proposed action.
	Fish would continue to be lost due to canal dewatering and reduction of minimum flows would adversely affect downstream aquatic habitat.	Canal Outages – Notify licensing stakeholders of all annual planned and non-routine planned canal outages at the annual consultation meeting; provide required minimum streamflow, or inflow, whichever is less. For canal outages expected to extend past 30 days, consult with agencies and notify Commission of any modifications to minimum streamflows agreed on for the outage period. Notify agencies within one business day in event of emergency outage.	Same as proposed action.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Flows decline rapidly once spill terminates; stage (water depth) in downstream reaches can decrease rapidly with the potential for stranding aquatic organisms.	Spill Cessation and Minimization of Flow Fluctuations in Middle Yuba River, Canyon Creek, and Bear River - Implement spill cessation schedule at Milton diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay dam to avoid short-term high-flow fluctuations in the downstream reaches. Existing stranding of aquatic organisms would be minimized.	Same as proposed action.
	Occasional rapid fluctuations in flow releases and spills from Rollins dam with the potential for stranding aquatic organisms.	Rollins Reservoir Elevation Control to manage spill cessation and flow fluctuations – Manage the elevation of Rollins reservoir within the top 2 or 3 feet by adjusting the draft out of the reservoir into the Bear River based on inflows to Rollins reservoir that are greater than downstream water supply demand in order to eliminate rapid fluctuations in the Bear River below Rollins dam. Existing fish stranding would be minimized.	Same as proposed action.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	No ongoing monitoring of this stream reach, so effectiveness of existing measures unknown.	Steephollow Creek foothill yellow-legged frog monitoring - Baseline monitoring of foothill yellow-legged frog in Steephollow Creek in first 3 years of license to assess effects of intermittent spills from Chicago Park flume; spill event-based (>100 cfs, April 1-June 15; >300 cfs, June 16-September 15) monitoring during years 2 and 3.	Same as proposed with additional protective BLM and California Fish and Wildlife measures.
	Some fish residing in project canals may be lost when canals are drained during canal outages.	Implementation of the Canal Fish Rescue Plan would minimize loss of fish.	Same as proposed action.
	Undetermined level of entrainment of resident fish at entrance to Milton-Bowman conduit would continue.	Milton-Bowman conduit fish entrainment – monitor fish entrainment from April 15 through August 15 by placing a net(s) into the conduit and sampling each week for a 96-hour continuous period beginning on a randomly selected day each week. Sampling each week may be reduced to a 48-hour continuous period, to be randomly selected, if 5 or fewer fish were collected in the previous week.	Implement Mitigation for Fish Entrainment Plan including design, installation, and seasonal operation of fish screen per California Fish and Wildlife recommendation.
	LWD is periodically removed at log boom upstream of Rollins dam and stockpiled or burned, reducing downstream aquatic habitat.	Rollins Dam LWD Management – Relocate LWD that accumulates on the upstream side of Rollins dam spillway log boom to the downstream side where it can pass over the spillway during spill events.	Same as proposed action with an additional requirement in BLM condition to conduct LWD surveys at 5-year intervals downstream of Rollins reservoir.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Existing stream gages would continue to operate as designed. Unable to monitor compliance with minimum flows for stream reaches without gages.	Gaging Plan – Measure streamflow for each of the reaches with a minimum streamflow requirement. Modify existing gages or install new streamflow gages in some of the reaches with a new minimum streamflow requirement.	Same as proposed.
	No measures to control aquatic invasive species in project-affected waters.	Implementation of the Aquatic Invasive Species Prevention Guidelines section of Non-Native Invasive Plant Management Plan would minimize the spread of aquatic invasive species.	Same as proposed action.
	No ongoing monitoring of aquatic resources in project-affected stream reaches, so effectiveness of existing measures unknown.	Implement Aquatic Monitoring Plan - including fish in selected large streams and rivers, foothill yellow-legged frog, water stage and temperature, incidental recording of western pond turtle and aquatic invasive species	Same as proposed action.
Terrestrial	No restrictions on use of pesticides or herbicides on project lands could result in harm to environmental resources.	Restricting use of pesticides or herbicides on federal land would protect sensitive species. Submit approval for planned pesticide uses on federal land during Annual Consultation Meeting.	Refrain from using pesticides or herbicides on federal project lands without prior written approval by appropriate agencies.
	The spread of noxious weeds can impact wildlife habitat.	Implementation of Non-Native Invasive Plant Management Plan would control the spread of noxious weeds and protect wildlife habitat.	Same as proposed action but apply to non-federal project lands.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Management of vegetation could affect wildlife species and habitat.	Implementation of a Vegetation Management Plan on federal land would minimize effects to wildlife and habitat.	Same as proposed action but apply to non-federal project lands and protect culturally important species.
	Project transmission lines could result in mortality of raptors and other birds from electrocution and collision.	Implementation of measures needed to ensure protection of birds in areas where collisions/electrocution present a problem would minimize effects.	Use of raptor-safe powerline configurations consistent with Avian Protection on Power Lines guidelines for new powerlines and when replacing existing structures would minimize risk of mortality.
	Mortality of deer and other target species would continue to occur and wildlife movement would be restricted.	Consult with California Fish and Wildlife, and appropriate agencies, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings. Assess wildlife escape and crossing structures annually. Annually monitor animal losses in project canals, including details of mortality.	Same as proposed action, but NID would be required to maintain two and construct one wildlife crossing structures in the Bowman-Spaulding canal according to Forest Service condition 34 and prepare an annual report with recommendations to reduce animal mortalities.
	Bats that use project buildings may be affected by human activity.	Document known bat roosts within project buildings. If bats or signs of roosting are present where staff have routine presence, place humane exclusion devices to prevent occupation by bats, and annually inspect exclusion devices. These measures would minimize any impacts to bats.	Same as proposed action.
	Recreational use and disturbance could affect nesting bald eagles. No project-wide plan for the protection of bald eagles or bald eagle nests.	Implementation of Bald Eagle Management Plan would minimize impacts to nesting eagles from operation and maintenance and recreational use.	Same as proposed.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Recreation	Existing project recreation facilities would continue to serve the public but may not meet current demand or expectations.	Modify and enhance recreation facilities, as proposed in Recreation Plan, to increase public recreation opportunities.	Similar to proposed action, but includes additional measures outlined in the NID alternative 4(e) condition Recreation Plan at East Meadow Campground, Pass Creek Boat Launch, Aspen Picnic Area, Fir Top Campground, and Jackson Point Boat-in Campground. Also includes additional improvements to the Pass Creek Boat Launch, pedestrian trails at Fir Top Campground; accessible toilets at Findley, Woodcamp, and Jackson Creek, campgrounds; improvements to Silvertip group campground; parking and OHV barriers at Jackson Creek Campground.
	Existing trails within the project boundary would continue to serve the public.	Add and improve trails, as proposed in the Recreation Plan to enhance trail use.	Similar to NID's proposed action but does not include modifications or enhancements to trails, trailheads or trail facilities (trailhead parking, kiosks, etc.) that are located outside the project boundary, unless such trails directly connect or are intended to connect two or more project facilities .
	Existing boat ramps at the project would continue to provide boat launching opportunities at Jackson Meadows and Rollins reservoirs under some reservoir water level conditions.	No boat ramp extensions are proposed as part of the NID proposed Recreation Plan.	Extend the Pass Creek boat ramp to make it useable through September 30 in a critically dry water year as outlined in NID's alternative 4(e) condition Recreation Plan, which would significantly enhance boating opportunities at Jackson Meadows reservoir.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Project recreation facilities would continue to be maintained.	Recreation facility operation and maintenance proposed by in the Recreation Plan would ensure recreation facility maintenance is done on an appropriate schedule and would enhance the condition, usability, and safety of project recreation facilities.	Similar to NID's proposed action but includes additional clarification on maintenance standards, as outlined in NID's alternative 4(e) condition Recreation Plan.
	Monitoring of recreational use at the project would continue to occur on a 6-year cycle.	Recreation use monitoring proposed in the Recreation Plan would enhance the level of information gathered on recreational use at the project facilities, as well as on facility condition.	Similar to NID's proposed action but includes additional monitoring measures outlined in NID's alternative 4(e) condition Recreation Plan.
	Fish stocking would continue at selected project reservoirs. Existing levels of fish stocking may not meet current or future angler demand.	Funding of California Fish and Wildlife for the stocking of up to 20,000 trout fry and 25,000 kokanee fry in Bowman Lake and the stocking of up to 10,000 catchable rainbow trout, 10,000 catchable brown trout, and 25,000 kokanee fry in Rollins reservoir.	In lieu of funding California Fish and Wildlife for fish stocking, development and implementation of a fish stocking plan for the project would ensure that fish stocking continues at existing stocked reservoirs and lakes to meet current and future ecological and recreational needs.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
	Existing stream flows and flow releases would provide whitewater boating opportunities along various project stream reaches at the current frequency.	Flow reductions during spill cessation at Milton Diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay dam would minimize flow fluctuations in downstream reaches and enhance whitewater boating opportunities at the project. Supplemental flows for whitewater boating at the Milton diversion dam, French dam, and Bowman-Spaulding diversion dam would significantly enhance whitewater boating opportunities in three reaches.	Same as proposed action.
	Streamflow information would continue to be available at existing stream gages and through existing public information outlets.	Daily streamflow information would be available to the public via internet, which would make it easier for recreational users to check on current streamflow conditions at river/stream reaches directly affected by project operations.	Same as proposed action.
Cultural	Significant cultural resources (i.e., historic properties) would be adversely affected by project-related activities and effects.	Implementation of the HPMP upon license issuance would protect cultural resources and resolve project-related adverse effects to historic properties.	Same as the proposed action.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Land Use	Continue to maintain all project roads and facilities.	Implement the Transportation Plan filed with the Commission to improve road management and to ensure public access to project lands and waters and the adequate protection of natural and environmental resources.	Same as proposed action.
	Continue to follow State of California and local rules and regulations. Continue to implement emergency response preparedness requirements.	Implement the Fire Prevention and Response Plan on federal lands filed with the Commission to reduce the occurrence of wildfires in the project area, and to minimize damage to natural resources.	Revise the Fire Management and Response Plan to include all project lands.
	Project boundary would include facilities not necessary for the continued operation of the project and would not include all primary project roads and recreation facilities.	Revise the project boundary to remove the mineral survey area south of the Dutch Flat afterbay, the administrative site at Jackson Meadows reservoir, and the recreation road that provides access to it, and to include certain primary project roads, and new and rehabilitated recreation facilities.	Same as proposed action.
	Continue to comply with existing regulations regarding hazardous materials.	Development and implementation of a Rollins upgrade construction hazardous materials spill prevention, control and countermeasure plan would minimize the risk of chemical spills.	Develop and file a single, project-wide hazardous substances plan to identify acceptable prevention and mitigation measures and to ensure that hazardous substances are promptly contained or cleaned up.

Table 5-4. Comparison of alternatives for the Yuba-Bear Project. (Source: staff)

Resource	No-action Alternative	Proposed Action	Staff Alternative
Aesthetic Resources	Visual quality would be degraded by project facilities.	Implement the Visual Resources Management Plan to reduce project visual effects and improve the visual quality in the project area.	Same as proposed action.

5.2.2 Comprehensive Development and Recommended Alternative

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreation opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Yuba-Bear Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative as the preferred alternative for the Yuba-Bear Project. This alternative includes elements of the applicant's proposal, section 4(e) conditions, resource agency recommendations, alternative conditions under the EAct, and some additional measures. We recommend this alternative because: (1) issuance of a new hydropower license by the Commission would allow NID to operate the project as an economically beneficial and dependable source of water and electrical energy for its customers; (2) the 79.3 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources and would provide improved recreation opportunities at the project.

Finally, for the reasons outlined in section 5.2.2.3, we recommend that certain 4(e) conditions specified by the Forest Service or BLM, in whole or in part, not be included in the staff alternative. We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative would not be included in any license issued by the Commission. Instead, those staff-modified conditions would be replaced with agencies' corresponding conditions, as filed with the Commission.

Of the 23 Forest Service section 4(e) conditions we consider to be environmental measures, we wholly include 17 of these conditions in the staff alternative as specified by the Forest Service. Of the six Forest Service conditions not wholly included in the staff alternative as specified by the Forest Service, we recommend modifying: (1) Flow Measures (aspects of condition 29); (2) Terrestrial Protective Measures (aspects of condition 34); (3) Monitoring Program (condition 35); (4) Recreation Plan (condition 41); and (5) Historic Properties Management Plan (condition 43). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 12/34).

Of the 43 BLM section 4(e) conditions we consider to be environmental measures, we wholly include 36 of these conditions in the staff alternative as specified by BLM. We recommend modifying: (1) Ecological Group (condition 12); (2) Monitoring Program (condition 23); (3) general recreation site measures (condition 31); (4) Chicago Park Power House and Connecting Facilities and Roads (condition 34); and (5) and Historic Properties Management Plan (condition 38). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 20/52).

In the following section, we make recommendations as to which environmental measures proposed by NID or recommended by agencies or other entities should be included in any license issued for the project. In addition to NID's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any license issued for the project, and we describe these requirements in the draft license articles in appendix G.

5.2.2.1 Measures Proposed by NID

Based on our environmental analysis of NID's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by NID would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project. Our recommended modifications to NID's proposed measures are shown in *italic* text.

General Measures

- Consult annually with the Forest Service and BLM to review operations and monitoring data from the prior year and conduct planning for ongoing project operations.
- Conduct annual employee training to familiarize project staff with special status species, non-native invasive plants, and sensitive areas known to occur within the project boundary on Forest Service or BLM land, and the procedures for reporting to each agency.
- Annually review special status species lists and assess new species on federal project lands.
- Consult with the Forest Service, BLM, or, as appropriate, California Fish and Wildlife, to determine potential project-related effects of any proposed future ground-disturbing activity on federal project land.
- Develop and implement a coordinated operations plan for Yuba-Bear Project and Drum-Spaulding Project regarding implementation of flow-related measures in each project's license.
- Obtain prior written approval of the Forest Service or BLM, as appropriate, for the use of pesticides or herbicides on or affecting public land.

Geology and Soils

- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during the Rollins upgrade construction.
- Develop and implement an erosion control and restoration plan to prevent adverse effects on environmental resources associated with erosion during recreation facility construction.

- Implement a Clear and Trap Creeks Channel Stabilization Plan to stabilize existing erosion effects from spills in two stream channels and one spill channel directly downstream of the Bowman-Spaulding canal.
- Implement an Erosion Control and Slope Maintenance Plan to identify the means to inventory, record, treat, and monitor potentially significant project-related erosion and sedimentation impacts on federal project lands and minimize future erosion and sedimentation.

Aquatic Resources

- Use six water year types (wet, above normal, below normal, dry, critically dry, and extreme critically dry) to determine appropriate monthly minimum streamflows, as shown in appendix A-2, table 3-98. *Implement extreme critically dry water year type flows in the second year of two sequential critically dry years.*
- To enhance aquatic habitat and support and protect resident aquatic species, provide the same or increased minimum streamflows to six project-affected reaches and provide new minimum streamflows to eight project-affected reaches, as described in section 3.3.2.2.1, *Water Quantity*, and shown in the tables of appendix A-2 as listed below.

Project-Affected Reach	Table No. in Appendix A-2
Middle Yuba River – below Jackson Meadows dam	3-149
Middle Yuba River – below Milton diversion dam	3-151
Wilson Creek – below Wilson Creek diversion dam	3-155
Jackson Creek – below Jackson dam	3-156
Canyon Creek – below French dam	3-157
Canyon Creek – below Faucherie dam	3-159
Canyon Creek - below Sawmill dam	3-161
Canyon Creek – below Bowman-Spaulding diversion dam	3-163
Texas Creek – below Texas Creek diversion dam	3-167
Clear Creek – below Bowman-Spaulding diversion conduit	3-168
Trap Creek – below Bowman-Spaulding diversion conduit	3-173
Rucker Creek – below Bowman-Spaulding diversion conduit	3-174
Bear River – below Dutch Flat afterbay dam	3-175
Bear River – below Rollins dam	3-178

- Notify licensing stakeholders at the annual consultation meeting of all annual planned and non-routine planned canal outages in the Bowman-Spaulding diversion conduit. Provide minimum

streamflow or inflow, whichever is less during canal outages in Bowman-Spaulling conduit and Drum-Spaulling Project's Drum canal. Consult with licensing stakeholders if the outage is anticipated to extend past 30 days and notify the Commission of any modifications to minimum streamflows agreed on for the extended outage period. Notify agencies within one business day in event of emergency outage.

- Implement overwintering minimum streamflow adjustments below Milton diversion dam and Bowman-Spaulling diversion dam in response to extended periods of low regional precipitation, as described in section 3.3.2.2.1, *Water Quantity*.
- Measure streamflows at specified locations for documenting compliance with the proposed minimum streamflow requirements listed above and described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, table 3-189.
- Implement the periodic minimum streamflow settings due to remote location and access difficulties at Wilson Creek diversion dam, as described in section 3.3.2.2.1, *Water Quantity*.
- From May 1 through September 15, avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park powerhouse in a synchronous condense mode when the unit is not generating electricity. During non-routine planned outages that would cause Dutch Flat afterbay dam to spill to the downstream Bear River, make a good faith effort to motor the Chicago Park powerhouse until the increased flows from the Dutch Flat afterbay dam reach the tailrace of Chicago Park powerhouse to prevent a sharp decrease in flows in the Bear River downstream of the Chicago Park powerhouse.
- To reduce the risk of stranding of aquatic resources, implement spill cessation schedules and minimize flow fluctuations at Milton and Bowman-Spaulling diversion dams and Dutch Flat afterbay dam, as described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, tables 3-184, 3-185, 3-186, and 3-187.
- To prevent rapid flow fluctuations in the lower Bear River below Rollins dam, balance inflow from upstream with outflows when the Rollins reservoir water surface elevation is within the top 2 to 3 feet of the reservoir.
- Implement minimum streamflows for the Fall Creek diversion dam, as described in section 3.3.2.2.1, *Water Quantity*, as shown in appendix A-2, table 3-170.
- Implement a Canal Fish Rescue Plan to minimize fish losses when canals are drained for maintenance and repair.
- Monitor numbers of fish entrained into the Milton-Bowman conduit weekly from April 15 through August 15 and provide a report evaluating effects of entrainment to the Forest Service, California Fish and Wildlife, and the California State Water Resources Control Board (California Water Board) for review and approval.
- Annually in October, relocate LWD that has accumulated on the upstream side of Rollins dam spillway log boom to the downstream side of the log boom. Allow the LWD between the log boom and spillway to pass over the spillway when the reservoir spills to enhance aquatic habitat in the Bear River below Rollins dam.

- Implement an Aquatic Monitoring Plan to assess the effects of proposed flow modifications on aquatic resources in selected project-affected stream reaches.
- Implement aquatic invasive species management measures to minimize the potential for the introduction, dispersal, and growth of non-native invasive species in project-affected waters.

Terrestrial Resources

- Implement a Non-Native Invasive Plant Management Plan to manage invasive weeds on federal lands within the project boundary through prevention, surveys, management, and reporting, *as amended to include non-federal lands*.
- Implement a Vegetation Management Plan on federal project lands to restore native vegetation in areas disturbed by project operation and maintenance through revegetation, *as amended to include non-federal project lands and to protect culturally important species*.
- Record annually all incidental observations of bird collisions/electrocutions at the Bowman-Spaulding transmission line. Consult with the Forest Service, U.S. Fish and Wildlife Service, and California Fish and Wildlife concerning measures needed to ensure the protection of birds where incidental observations of bird collisions/electrocutions illustrate a problem pole or transmission structure. Replace or retrofit poles with substantial raptor-project interaction issues as appropriate.
- Consult with the Forest Service or BLM, as appropriate, prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along project canals, and consult with California Fish and Wildlife regarding specifications and design. Assess existing wildlife escape facilities annually to ensure they are functional and in proper working order.
- Record animal losses from drowning in all project canals. Provide this information to California Fish and Wildlife, the Forest Service, or BLM, as appropriate, as well as to the Commission. In consultation with the appropriate resource agencies, develop additional measures to address suspected project-related causes of mortality if there is an increasing trend in wildlife mortalities in a canal. *Submit a report and recommendations with protective measure to appropriate agencies*.
- Document all known bat roosts within project buildings, dams, or other structures. Provide inspection results to California Fish and Wildlife, the Forest Service, and BLM, as appropriate. If bats or signs of roosting are present where project personnel routinely work, place humane exclusion devices to prevent occupation of the structure by bats.
- Implement a Bald Eagle Management Plan to protect nesting bald eagles from disturbance during project operations and recreational activities
- Monitor the foothill yellow-legged frog population in Steephollow Creek from the confluence with the Bear River for a distance of 1,000 meters (1,094 yards) upstream, to assess if spills from the Chicago Park conduit result in adverse effects on the foothill yellow-legged frog population in Steephollow Creek and, if necessary, to facilitate the development of mitigation measures, *as amended to include further reduction of large magnitude spills and increased monitoring of foothill yellow-legged frog*.

- Conduct event-based monitoring of the foothill yellow-legged frog populations in Steephollow Creek beginning the second full calendar year after a spill event and repeat in the third year following that spill event, and submit a monitoring report to BLM, California Fish and Wildlife, and the California Water Board.

Recreation Resources

- Implement a Recreation Plan for upgrades, maintenance, and development of new project recreation facilities on federal project lands, *as modified with regard to the implementation schedule, trail development, campground upgrades, accessibility, parking and road improvements, boat launches, water systems, and monitoring, and to exclude provisions for campground hosts or added amenities at campground host sites, and enhancements to trails, trailheads, or trail facilities that do not serve a project purpose.*
- Provide recreation flow information via the internet *year-round* for the following locations: Jackson Meadows reservoir; French Lake; Faucherie Lake; Sawmill Lake; Jackson Lake; Bowman Lake; Rollins Lake; Middle Yuba River below Milton diversion dam; Canyon Creek below Bowman dam; and Bear River below Rollins dam.
- Make mean daily streamflow information related to recreation boating opportunities available to the public via the internet from May 1 through November 30 for: Jackson Meadows reservoir; French Lake; Faucherie Lake; Sawmill Lake; Jackson Lake; Bowman Lake; Rollins Lake; Middle Yuba River below Milton diversion dam; Canyon Creek below Bowman dam; and Bear River below Rollins dam, *as modified to provide information year-round.*
- Provide supplemental flows (target streamflow of between 120 and 150 cfs over a continuous 24 hour period as measured at gage YB-306) in Canyon Creek below French dam for whitewater boating starting between September 1 and September 30 of each year, until the date that French Lake elevation reaches 6,638 feet msl.
- Provide recreational streamflow events (continuous mean daily target streamflow of 300 cfs for at least 6 continuous days as measured at USGS gage 11408550 [Middle Yuba River below Milton diversion dam]) in any years in which spill at Milton diversion dam is 300 cfs or greater after May 1.
- Provide recreational streamflow events (continuous mean daily target streamflow of 275 cfs for at least 5 continuous days as measured at gage 11416500 [Canyon Creek downstream of the Bowman-Spaulding diversion dam] after April 1) in any years in which flow as measured at USGS gage 11416500 is 275 cfs or greater.

Cultural Resources

- Implement an Historic Properties Management Plan (HPMP) upon license issuance to ensure protection of cultural resources and resources that are eligible for inclusion in the National Register of Historic Places.

Land Use and Aesthetic Resources

- Implement a Transportation Management Plan to rehabilitate and maintain primary project roads to ensure that project roads are adequately maintained.

- Implement a Fire Prevention and Response Plan to provide fire prevention procedures, reporting, and safe fire practices for NID personnel and contractors responsible for operating and maintaining the project, *as revised to include all project lands and to include a period of review and revision.*
- Revise the project boundary to remove the mineral survey area south of the Dutch Flat afterbay and the administrative site at Jackson Meadows reservoir and the recreation road that provides access to it and to include certain primary project roads, and new and rehabilitated recreation facilities.
- Develop and implement a hazardous materials spill prevention, control, and countermeasure plan for the Rollins upgrade construction, *as modified to address spill prevention, control, and countermeasures for all project uses/activities on all project lands.*
- Develop and implement a recreation facilities construction hazardous materials spill prevention, control and countermeasure plan, *as modified to address spill prevention, control, and countermeasures for all project uses/activities on all project lands.*
- Implement a Visual Resource Management Plan on federal lands to improve the visual quality of the project by reducing the visual contrast of existing and proposed project facilities.

5.2.2.2 Additional Measures Recommended by Staff

In addition to NID's proposed measures listed above (and modified as indicated), we recommend the following staff-recommended measures in any license that may be issued for the Yuba-Bear Project:

- Develop and implement a Fish Entrainment Protection Plan for the Milton-Bowman conduit, including design, installation, and operation of fish screens to minimize entrainment of juvenile fish into the conduit.
- Prepare and implement a LWD management plan to ensure passage of LWD at project dams and diversions to support downstream aquatic habitat, as necessary, including Middle Yuba River below Jackson Meadows dam, Canyon Creek below Bowman dam, Bear River below Dutch Flat afterbay dam, and Bear River below Rollins dam.
- Provide minimum streamflows below Fall Creek diversion dam to protect and enhance aquatic habitat.
- Provide one new wildlife crossing on Bowman-Spaulding canal and maintain two existing crossings to minimize wildlife injury and mortality associated with movement across this project canal.
- Annually review special status species list and assess new species on federal project lands to ensure environmental measures are adequate if new special status species are identified on project-affected lands.
- Develop and implement a fish stocking plan that addresses stocking in Rollins reservoir, Jackson Meadows reservoir, Bowman Lake, and Faucherie Lake, but also includes provisions for stocking fish in additional project reservoirs based on changes in recreational use and angling pressure over the term of the new license (replaces NID's proposal to pay for fish stocking).

Below, we discuss our rationale for some of the key proposed and additional staff-recommended measures.

Minimum Streamflows

To protect and enhance aquatic resources NID, Forest Service, BLM, and California Fish and Wildlife have agreed on minimum streamflows for project-affected reaches. These flows would generally be the same or higher than under the existing license and, in some cases, higher than estimated unregulated streamflows during the dry summer period. Many of these project-affected stream reaches have no minimum streamflow requirement under the existing license.

In many project-affected stream reaches the proposed minimum streamflows would vary depending on six water year types from extreme critical dry to wet based on California DWR Bulletin 120. These flows, particularly in larger stream reaches with higher base flows, would create seasonal and interannual flow variability more typical of natural unregulated streams. Extensive analysis by NID of the relationship of habitat and flow in these reaches supports the finding that the proposed higher minimum streamflows and increased flow variability would protect and enhance aquatic habitat for resident species.

We estimate that the annualized cost to deliver the proposed minimum streamflows would be \$56,000 with an additional \$1,000 annual cost to determine and implement flows based on water year types. We recommend adopting these flow measures because substantial benefits to fish habitat are worth the cost.

NID also proposed two methods for demonstrating compliance with proposed minimum streamflows depending on the location and accessibility of the dam and the flow control structure. At dams where access is not an issue compliance would be demonstrated by the continuous, instantaneous record from designated existing, modified, or new stream gages maintained and operated consistent with USGS protocols. However, Wilson Creek diversion dam is at a remote location that is difficult to access and where safety is also an issue for winter access. At this location, compliance with minimum streamflows would be the periodic act of setting the dam outlet structure to provide the required minimum streamflow. Given the safety constraints, we conclude that this is a reasonable approach for determining compliance with minimum flow requirements. We estimate that the annualized cost to implement these two streamflow compliance measures would be \$95,000. We recommend adopting these proposed compliance measures because they would be an effective mechanism to demonstrate compliance with proposed minimum streamflows at a reasonable cost.

Spill Cessation and Minimization of Flow Fluctuations in the Middle Yuba River, Canyon Creek, and Bear River

Rapid reductions in flow following a spill event can adversely affect aquatic resources in downstream reaches, particularly life stages that are immobile or have limited mobility. NID proposed a schedule for more gradual rate of flow reduction from May through September following spills to the Middle Yuba River from Milton diversion dam, Canyon Creek from the Bowman-Spaulding diversion dam, and Bear River from Dutch Flat afterbay. This schedule was also recommended by Forest Service, BLM, and California Fish and Wildlife. This proposal would reduce spill flows from 300 cfs to the specified minimum streamflow for the particular month and water year over a period of up to 22 days in the Middle Yuba River below Milton diversion dam. Following a spill, flows in Canyon Creek below the Bowman-Spaulding diversion dam would be reduced from 275 cfs to the specified minimum streamflow appropriate to the month and water year over a period of up to 21 days.

NID proposed a spill cessation schedule for the Bear River below Dutch Flat afterbay to reduce spill flows following an outage of the Chicago Park flume and or powerhouse. The rate of reduction would depend on the duration of the outage and spill; two schedules are proposed for spills of 3 days or less and spills longer than 3 days. Following a short spill, NID would reduce flows from 75 cfs to the appropriate minimum streamflow over a 3-day period. Following a longer spill, NID would reduce flows from 75 cfs to the appropriate minimum streamflow over a period of up to 21 days.

NID's proposed spill cessation measures would minimize the rapid fluctuations in flow associated with the end of spill events in the Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman-Spaulling diversion dam, and in the Bear River below Dutch Flat afterbay, which would reduce stranding of aquatic organisms. We recommend adopting this measure because it would result in flow reductions following spill events that mimic the natural recession from high flows and provide a substantial benefit to fish and aquatic habitat at a reasonable annual cost of \$20,000.

Canal Outages

In certain situation, flows released from project canals to stream reaches provide minimum instream flows for protection of aquatic resources. When these canals are taken out of service during planned maintenance or during unplanned emergencies, the canals drain and become dry. In these instances, flow releases from the canals to the stream reaches are interrupted and flow in the stream reaches downstream of the canal are maintained only by inflow, which at some locations could be reduced to no flow during some months. In other stream reaches, canal outages could result in abrupt spill, resulting in abnormally high flows.

NID identified project-affected stream reaches where its ability to deliver minimum streamflows could be affected during maintenance and emergency outages of project canals, conduits, and flumes. During canal outages, NID proposes to meet the required minimum flow for that month and water year, or the natural inflow, whichever is less. The Forest Service, BLM, and California Fish and Wildlife recommend NID's proposal for canal outages that affect streamflows. NID proposes to notify all licensing participants at the annual consultation meeting of the past year unplanned and future year planned canal outages, and also propose to notify and consult with licensing participants if a canal outage is anticipated to extend beyond 30 days.

NID proposes and BLM, Forest Service, and California Fish and Wildlife recommend implementation of a plan to protect fish residing in project canals when a canal is drained during a planned, unplanned, or emergency outage. NID filed (August 30, 2012) a Fish Protection and Management during Canal Outages Plan that identifies the canals, locations and procedures for fish collection and rescue, and procedures for notifying the resource agencies. The plan would be implemented within the first year following issuance of the license for the Yuba-Bear Project. We estimate that the annualized cost of this plan would be \$52,000. We recommend adopting this measure because it would reduce fish mortality associated with canal outages during planned maintenance and during unplanned emergencies at a reasonable cost.

Milton-Bowman Conduit Fish Entrainment Protection Plan

Fish entrainment into the Milton-Bowman conduit is occurring but NID is suggesting that the level of entrainment is uncertain. Study results (technical memorandum 3-5, *Fish Entrainment*) using hydroacoustic methods indicated that fish entrainment at the entrance to the Milton-Bowman conduit may be relatively high. However, NID concluded that the estimates of entrainment from the hydroacoustic monitoring may be overestimated because the hydroacoustic signal may have not adequately distinguished between fish and debris entering the canal and may have frequently recorded multiple counts of individual fish meandering in the conduit in the vicinity of the hydroacoustic equipment.

NID proposes to monitor fish entrainment into the Milton-Bowman conduit on a weekly basis between April 15 and August 15. Forest Service condition 29 specifies and California Fish and Wildlife recommends the design and construction of a cylindrical narrow-slot fish screen at the entrance to the Milton-Bowman conduit. The condition/recommendation includes design guidelines and specifications from *Fish Screening Criteria for Anadromous Salmonids* (NMFS, 1997) and *Fish Screening Criteria* (California Fish and Wildlife, 2002). The Fish Entrainment Protection Plan would identify required local, state, and federal permits; specify design information; develop a construction implementation schedule; develop design, construction, and operation and maintenance costs; and outline an agency (Forest Service, California Fish and Wildlife, and California Water Board) consultation process/schedule for planning, permitting, and construction of the screens. The plan and applications for all permits would be completed within 1 year of license issuance and construction would be completed within 2 years of receiving the necessary permits and approvals.

Entrainment of fish into the Milton-Bowman conduit results in permanent loss of resident trout, particularly for early life stages of resident rainbow trout from the Middle Yuba River population. In addition, the unique design of the conduit results in the total loss of resident trout during dewatering of the conduit as a result of planned and unplanned outages.

Because the Milton-Bowman conduit is a tunnel over most of its length, access is not practical or feasible for rescue of entrained fish during a canal outage. Therefore, entrainment of fish into the Milton Bowman conduit results in permanent loss of these fish from the Middle Yuba River population. In addition, NID did not provide specific information to substantiate their assumption that the study results over estimated entrainment.

The quality of the trout fishery in the reach in the vicinity of the Milton diversion dam is likely affected by many factors including both the existing minimum streamflows and permanent loss of a portion of the fish population by entrainment into the Milton-Bowman conduit. To support higher instream flow releases to the Middle Yuba from the project, California Fish and Wildlife states that the abundance, biomass, and condition of trout in this stream reach are not as high as in other reference study reaches. We find that the relatively high level of entrainment into the conduit combined with the effects on aquatic habitat of the existing minimum flows has substantially reduced the quality of the resident trout fishery. With the improvement in aquatic habitat as a result of increased minimum flows, along with eliminating the permanent loss of resident trout by entrainment with screening of the conduit, enhancement of the resident trout population is likely, with a associated improvement in the quality of the trout fishery with a potential for high recreational value to fisherman. For these reasons, we recommend the development and implementation of the Fish Entrainment Protection Plan for Milton-Bowman conduit, as specified in Forest Service condition 29, and outlined by NID in its alternative 4(e) conditions (August 30, 2012). We estimate that the annualized cost of this plan would be \$245,000. Implementation of the Fish Entrainment Protection Plan would minimize fish entrainment and loss at an annualized cost of \$245,000, but given the impacts to the rainbow trout fishery noted above and the recreational value of the fishery, the fish protection measures are worth this cost.

Large Woody Debris Management Plan

NID manages the LWD trapped in the log boom at Rollins dam and other project reservoirs by removing the LWD from the log boom, stockpiling it, and burning it onsite. NID proposes to relocate the LWD that accumulates on the upstream side of the Rollins dam spillway log boom to the downstream side of the log boom where it would pass over the dam during periods of high flow.

NID proposes no plan for the Milton and Bowman-Spaulding diversion dams because it explains that LWD is not trapped by these facilities, but passes over these structures. Other smaller, high elevation

lakes are excluded from NID's plan because the associated watersheds and downstream reaches are granitic bedrock canyons, which generate minimal LWD for downstream reaches.

BLM condition 9 specifies and California Fish and Wildlife recommends an additional survey of the quantity and distribution of LWD along the 10-mile reach of the Bear River downstream from Rollins dam during the first year following issuance of the license and at 5-year intervals thereafter. LWD would be anchored in the channel, as needed. BLM condition 24 specifies a similar LWD program at the Dutch Flat afterbay dam (Chicago Park development).

Forest Service condition 36 specifies a more project-wide LWD management program, including survey of locations and quantity of LWD collected and identification of appropriate locations downstream of project dams for reintroduction of LWD for mobilization during 2- and 5-year flow events. NID's alternative (August 30, 2012) to Forest Service conditions would implement an LWD management plan for Jackson Meadows and Bowman dams (the two largest project storage reservoirs on Forest Service lands) within 1 year of license issuance.

NMFS and FWS recommend development of an LWD management plan for future implementation to enhance habitat for eventual reintroduction of spring-run Chinook salmon and Central Valley steelhead in the Middle Yuba River below Milton diversion dam and Canyon Creek below the Bowman-Spaulding diversion dam. NMFS also recommends an interim measure for passage of LWD at Milton diversion dam and Bowman-Spaulding diversion dam beginning at license issuance until an LWD Management Plan can be developed and implemented when reintroduction occurs.

Available information suggests that some existing habitat conditions associated with LWD would likely support resident trout and anadromous salmonids. NID's studies indicated that the amount of LWD observed in project affected stream reaches (technical memorandum 1-1, *Channel Morphology, Attachment 1-11*) is less than observed in other Sierra Nevada (Ruediger and Ward, 1996) streams and is frequently not immersed within the stream channel (section 3.3.2.2, *Aquatic Resources, Environmental Effects*). Ruediger and Ward (1996) and Berg et al. (1998) reported that LWD is typically stable with little movement and played a limited role in aquatic habitat formation and cover. NID reported that the volume of LWD transported to and removed from project reservoirs is also relatively low and that LWD passes over most project dams and diversion dams (if it is not captured by log booms) during periods of high flow.

We recommend the development and implementation of an LWD management plan that includes the criteria defined in Forest Service condition 36, BLM conditions 9 and 24, and California Fish and Wildlife's recommendation 2.10 in combination with NID's 4(e) alternative to Forest Service condition 36. The combination of these measures identifies specific locations for LWD management, and describes the extent and frequency of surveys to assess the effectiveness of LWD mobilization and dispersal in the downstream reaches. LWD contributes to productive aquatic ecosystems and is an important component in the formation of complex aquatic habitat units and channel maintenance in some systems. We recommend adopting this measure because additional LWD surveys would identify stream reaches that require LWD management and could provide a substantial benefit to fish habitat at a reasonable annual cost of \$64,000.

Finally, we do not recommend implementation of the interim LWD measure proposed by NMFS for introduction of LWD into the Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam. The LWD Management Plan that we have recommended (section 3.3.2.2.8, *Aquatic Biota*) requires an LWD survey that would provide information for developing LWD management plans which would be implemented for specific stream reaches, as appropriate. This information would be used to evaluate the need for introduction of LWD in project-affected stream

reaches and is more appropriate to the existing aquatic resources in the Middle Yuba River and Canyon Creek.

Aquatic Invasive Species Management Plan

The Forest Service (condition 33) specifies and California Fish and Wildlife (recommendation 6) recommends that NID prepare and implement an Aquatic Invasive Species Management Plan. These agencies identify the types of information that should be included in the plan. NID proposes an Integrated Vegetation Management Plan (August 29, 2012) that includes a section (*Aquatic Invasive Species Prevention Guidelines*) for monitoring and management of aquatic non-native invasive species in project waters. In general, the NID plan contains the types of information identified by Forest Service and California Fish and Wildlife including prevention and educational measures, incidental monitoring, contingency measures if invasive species are found in project waters, and provisions for modification of the plan if more-effective control measures are developed in the future. We recommend that NID implement the Aquatic Invasive Species Prevention Guidelines that are included in the Integrated Vegetation Management Plan. The estimated annualized cost for implementation of NID's plan is about \$20,000. This would be a reasonable cost to the project and would provide protection from aquatic invasive species within the project boundary.

Aquatic Monitoring Plan

As discussed in section 3.3.2.2, proposed increases in minimum flows and management of spill cessation flows could affect habitat for resident fish species and the foothill yellow-legged frogs resulting from changes in habitat suitability, water temperature, aquatic and riparian vegetation, and channel morphology. The Forest Service (condition 35) and California Fish and Wildlife (recommendation 8) propose that NID develop a monitoring plan that would include monitoring of aquatic species, non-native invasive species, sensitive plants, recreation resources, cultural resources, wildlife crossing placement and effectiveness, and sensitive raptors. NID's alternative 4(e) condition to Forest Service condition 35 and BLM condition 23 would implement the Aquatic Monitoring Plan filed with the Commission. The Aquatic Monitoring Plan would assess the effects of new license conditions on the distribution, abundance, and conditions of fish populations and foothill yellow-legged frog at selected stream reaches most likely to be affected by those new license conditions. The plan includes: (1) locations of specific reaches to monitor; (2) species to monitor at each location; (3) methodology for monitoring of each species; and (4) installation of water temperature loggers between spring and fall in all study reaches.

NID's alternative 4(e) plan would include only incidental observations of western pond turtle, another special status species. However, specific surveys for western pond turtle recommended by the agencies are not appropriate because it is unlikely that this species would be affected by project O&M activities. Nesting and hatching success, key factors affecting the success of populations of western pond turtles that occur in terrestrial habitat, would not be affected by changes in project flows and riparian habitat. In addition, effective survey methods for identification of nesting sites have not been developed; and focused surveys for western pond turtle in the project boundary are not likely to provide any more detail.

NID's alternative 4(e) plan is generally consistent with the Forest Service's proposed framework for aquatic monitoring, addresses important aspects of the proposed monitoring, and provides a focused approach with sufficient detail for monitoring of aquatic resources. Implementation of proposed minimum streamflows and spill cessation schedules have been proposed in part to maintain cooler water temperatures to benefit aquatic resources in the affected reaches. NID's proposed Aquatic Monitoring Plan would include monitoring of water temperature in the study reaches providing information to evaluate the effectiveness of these flow-related measures for water temperature management and the effects on aquatic biota. In addition, implementation of the NID's Aquatic Monitoring Plan would

provide monitoring of aquatic resources within the project boundary, including observations of the foothill yellow-legged frog and incidental observations of the western pond turtle. NID estimated the annualized cost for its Aquatic Monitoring Plan would be \$80,000 and the monitoring information would be worth this cost.

Vegetation Management Plan

Invasive weeds occur throughout the project area. Project operations, maintenance, and recreation can act as a method of seed dispersal and create disturbed areas favorable to the spread of invasive weeds. NID's Invasive Plant Species Management Plan only covers federal lands, excluding NID and private lands located within the project boundary. Invasive weed populations are known to occur outside federal lands and are subjected to similar project-related effects within NID's boundary. We recommend that NID expand these plans to include all lands within the project boundary to the extent that access is allowed. The estimated annualized cost for the recommended invasive weed management and vegetation management plans is about \$48,000 per year. Expanding the plan to accessible non-federal project lands would increase the cost by an additional \$75,000 per year. This would be a moderate cost to the project and would provide adequate protection to native plant species within the project boundary.

Additionally, we recommend that NID protect culturally significant plant species to the tribes as part of their vegetation management plan.

Wildlife Crossing in Bowman-Spaulding Canal

The Bowman-Spaulding canal is located within critical deer summer range for the Nevada City Deer Herd. Although no mortality was reported in 2009, the canal can affect wildlife movement through the area.

Forest Service condition 34 specifies that NID maintain two existing crossing structures in functional condition for wildlife use on the Bowman-Spaulding canal (canal mile 1.5 and 5.8) and construct and maintain an additional crossing on the canal (canal mile 3.5). The two existing crossings are 30-foot-wide and 15-foot-wide, respectively, adequate to allow movement of target wildlife species. The additional crossing would replace an existing crossing that is only 3-feet-wide, inadequate for large wildlife species. These three structures would be identified as wildlife crossings maintained by NID and geo-referenced in a map provided to the Forest Service, BLM, and California Fish and Wildlife. California Fish and Wildlife recommended that NID maintain one existing wildlife crossing structure in the Bowman-Spaulding canal (canal mile 5.8), and either construct one new crossing or retrofit the existing crossing at canal mile 1.5.

The maintenance of two existing crossing structures in proper functioning condition and construction of a third, as specified by the Forest Service and consistent with the California Fish and Game recommendation, would ensure adequate wildlife protection at the Bowman-Spaulding canal. Implementation of this measure would ensure that the project effects on wildlife due to entrapment in canals would be minimal and would be worth the estimated levelized annual cost of \$22,000.

Project Powerlines and Raptor Collisions/Electrocutions

NID proposed a measure to annually record all incidental observations of bird collision/electrocutions along the Bowman-Spaulding transmission line. Observations would include date and location, species and number of birds, bird condition (i.e., dead or injured), band number, if available, and suspected cause of death. The proposed measure also specifies the use of raptor-safe powerline design as described in APLIC's "Suggested Practices for Avian Protection on Power Lines: The State of

the Art in 2006,” or the most current edition of this document, for new power lines or when replacing existing structures such as poles, phase conductors, and associated equipment on project lands. NID would also proposes to retrofit or replace problem poles, as appropriate.

Forest Service condition 34 is similar to NID’s proposed measure except the conditions except it specifies that if raptor collision monitoring indicates a substantial issue with raptor-project transmission line interactions, the poles where the interaction issue occurs would be replaced or retrofitted, as agreed via consultation with the Forest Service, FWS, and California Fish and Wildlife. The recording of incidental observations of bird collision/electrocutions at the Bowman-Spaulding transmission line and the use of APLIC’s “Suggested Practices for Avian Protection on Power Lines” would protect birds, including bald eagles, which habitually use powerline and other energized equipment within the FERC project boundary. The benefits would be worth a leveled total annual cost of \$4,000.

California Fish and Wildlife also recommends monitoring of incidental bird collisions identical to NID’s measure for the use of raptor-safe powerline design and configuration. However, California Fish and Wildlife also recommends that NID conduct an evaluation of project power poles to determine consistency with APLIC’s designs and modify those lines that do not meet APLIC standards. There is no evidence that these lines are having adverse effects to raptors or other large birds. The recording of incidental observations of dead birds, as discussed above, would provide information on problem poles and specific information to justify replacing only certain poles. Therefore, the benefits of California Fish and Wildlife’s more comprehensive evaluation of project power poles would be worth the leveled total annual cost of \$7,000, in addition to the unknown costs of correcting power pole design.

Recreation Plan

The project currently provides public recreation opportunities, and NID proposes extensive development, expansions, modifications, upgrades, and maintenance of public recreation facilities in its proposed Recreation Plan and in the alternative condition Recreation Plan. However, for reasons noted below, we recommend that NID include its alternative 4(e) condition Recreation Plan measures submitted on August 30, 2012, and our additional staff recommended recreation measures in its proposed recreation plan.

Individual and site-specific recreation measures contained in the proposed Recreation Plan and the alternative 4(e) condition Recreation Plan address the majority of project effects and meet identified recreation needs at the project. However, we also recommend several elements specified by the Forest Service in condition 41.

Implementation Schedule—Most of the facilities are in a functioning condition, and visitor needs are currently met by the spectrum of facilities and their existing conditions. However, some of the existing recreation facilities are currently, or would soon be, in need of modification and/or reconstruction to meet visitor needs, protect natural resources, and provide for public health and safety. For most facilities, our recommended schedule is the same as that proposed by NID in the Recreation Plan. However, for some facilities, we recommend an alternative schedule that is based on agency recommendations and our assessment of the current condition of the facility and user needs. We recommend that NID complete the improvements at the Pass Creek boat launch within 5 years; complete the upgrades to the Aspen group campground within 2 years; complete the improvements to the Aspen picnic area within 5 years; complete the upgrades to the Woodcamp campground within 3 years; complete the improvements to the Woodcamp picnic area within 5 years; complete the improvements to the Silvertip group campground within 5 years; complete the upgrades to the Jackson Point boat-in campground within 2 years; and complete the modifications to the Milton diversion impoundment 3 years. We estimate the added cost associated with these modifications to the facility development schedule to be minor on an annualized basis.

Trails—There are numerous trails in proximity to the project, and there is a demonstrated demand for trail use by project visitors. However, as discussed in section 3.3.5.2, *Recreational Resources, Environmental Effects*, and discussed further below, we find that some of the trail measures included in the proposed Recreation Plan include trails or trailheads that appear to be outside the project boundary, do not connect two or more project facilities, and do not serve a project purpose. Requiring NID to construct, reconstruct, modify, and maintain trails that are necessary for project purposes would provide additional trails for visitors and ensure they are properly maintained which, in turn, would minimize resource damage, such as erosion, and provide for visitor safety. Therefore, we recommend that the proposed trail improvements included in the Recreation Plan be limited to the construction of, modification to, and maintenance of trails and trailheads that are necessary for project purposes, including: (1) the East Meadow campground pedestrian trail; (2) the Pass Creek boat launch accessible shoreline trail; (3) the Aspen group campground pedestrian trail; and (4) the Woodcamp complex trail system.

In addition, we recommend that the Recreation Plan include provisions for the addition, or modification of project-related trails at the project, as specified by the Forest Service, including: (1) provisions for campground trail improvements at the Silvertip Group campground; (2) construction of the a non-motorized trail from Vista Point and Aspen Group campground to a lake overlook; (3) provisions for additional project-related trails at Sawmill Lake; (4) provisions for project-related pedestrian trails at Fir Top campground; and (5) addition of project-related trails at Faucherie Lake and French Lake. We also recommend that the Recreation Plan include provisions for trail and trailhead improvements for project-related trails in the Jackson Meadows area.

Campgrounds and Dispersed Campsites—Some existing campgrounds and campsites do not accommodate visitor needs and require expansion. Others are in need of facility upgrades or improvements to address deteriorating facility condition, improve usability and user safety, or improve access. In addition to NID's proposed actions at the project campgrounds, we recommend that the Recreation Plan include the following: (1) provisions for upgrading Pass Creek campground to include additional parking for vehicles and trailers, and to replace the restrooms with accessible restrooms; (2) barrier improvements at the Aspen Group campground to prevent OHV use; (3) provisions for necessary road improvements at Fir Top campground; (4) provisions for expanding parking and making upgrades to signage and trails at Silvertip group campground; (5) provisions for providing a campground or appropriate camping facilities in the Jackson Meadows area; (6) provisions for reconstructing the Canyon Creek campground to include a group campsite and provide accessible camping opportunities; and (7) provisions for improvements to the Faucherie Group campground, including toilet and picnic table replacement. We recommend these additional measures to improve campground conditions and meet existing and anticipated future needs. Modifications or additions to the campgrounds, as proposed, would provide recreational users of the project with improved opportunities for camping, with facilities and conditions consistent with those in the region.

Accessibility Improvements—Currently, a limited number of recreation facilities accessible to visitors with disabilities are provided at the project. NID is proposing a number of accessibility improvements at the project as part of facility modifications or upgrades. In addition to NID's proposed actions, we recommend the Recreation Plan include the following: (1) replace Pass Creek campground restrooms with accessible restrooms; (2) designate an accessible parking space at the Aspen group campground; (3) provide accessible parking at the Aspen picnic area; (4) replace the toilet at Findley campground with an accessible toilet; (5) replace the existing toilets at the Milton diversion impoundment primitive campsites with accessible toilets; (6) include provisions to provide accessible camping opportunities at Canyon Creek campground; and (7) include a provision to provide accessible parking at the Faucherie group campground. Constructing accessible recreation facilities would provide improved access to the project's recreational resources.

Parking and Road Improvements—Circulation roads and parking areas are important components of project recreation sites. General maintenance of facility roads and parking would be addressed by NID on an ongoing basis as outlined in the proposed Recreation Plan. However, some specific road and parking needs need to be addressed in the short term due to current recreation use. Therefore, we recommend the Recreation Plan include: (1) improvements to parking at the Jackson Meadows vista; (2) improvements to the existing parking area, including the installation of OHV barriers, at French Lake; and (3) expanded parking at Faucherie group campground. Addressing these issues within 5 years would provide visitors with improved access and would help meet existing needs in the short term. The additional parking facilities would provide visitors with improved access to the project, help meet existing and future demands, reduce vehicle congestion, and reduce parking in unimproved or unauthorized areas, which can lead to resource effects, such as erosion.

Boat Ramps and Boat Launch Facilities—Boat ramps for trailered boat launch are currently provided at Jackson Meadows reservoir and Rollins reservoir. Informal boat launch facilities, intended primarily for hand launching, are also provided at Milton diversion impoundment, Bowman Lake, Faucherie Lake, and the Dutch Flat afterbay. Some of these existing boat ramps and boat launch facilities are in need of an upgrade, expansion, or modification to improve launching conditions for recreational boaters to address issues associated with worn or deteriorating facilities, vehicle launching at sites intended for hand launching, as well as use-levels and crowding. In addition to NID's proposed measures for improving or modifying boat launch facilities, we recommend that additional parking be provided at the Pass Creek boat launch and that the launch be extended to provide low-water boat launching. Improvements to Pass Creek boat launch would enhance trailered boat launching at this site by providing a usable boat launch at lower reservoir water levels than what the current launch allows. Expansion of the parking area would reduce vehicle and trailer congestion, and would help to meet existing and future demand for boating access to Jackson Meadows reservoir. We also recommend the upgrade of the existing Woodcamp boat launch to a two-lane launch ramp with accessible courtesy dock. Although use at the Woodcamp boat launch is low, use rates at the Pass Creek boat launch are very high, and improvements to the Woodcamp boat launch, as specified by the Forest Service, would help to meet anticipated increased demand for boat launch facilities at Jackson Meadow reservoir overall.

Water Systems—Providing potable water at developed recreation sites at the project is consistent with amenities that are typically provided at Forest Service facilities with a development scale of 3 or higher. Visitor needs are currently not met at these types of project recreation facilities because some have no potable water. In addition to bringing the project water systems up to standard, as NID proposes, we also recommend that NID provide potable water at one of the Bowman Lake area campgrounds. This measure would benefit project visitors by providing a water source for recreationists using Bowman Lake.

Operation and Maintenance—NID proposes and the Forest Service specifies provisions for campground hosts in the Recreation Plan. NID may provide campground host sites, but the responsibility for project recreation facility operation and maintenance is the responsibility of NID, and campground hosts may or may not be needed. Therefore, we do not recommend including this requirement in the license. In addition, we recommend that the plan be modified to remove any requirements for NID to provide water and septic facilities at designated host campsites, such as that proposed at the Woodcamp campground. We estimate that upgrading this host site would cost an additional \$30,000 and cannot be justified.

Recreation Monitoring—The NID proposed Recreation Plan includes provisions for monitoring project recreation facilities over the term of the license. The NID alternative 4(e) condition Recreation Plan provides further details regarding the proposed monitoring measures, including monitoring triggers, indicators, and methods. Including additional detailed monitoring measures would ensure that the monitoring is conducted in a consistent manner. We recommend that the proposed Recreation Plan

include these additional detailed monitoring measures. NID provides no estimate of the additional cost of these monitoring measures; however, we conclude that specification of these measures would not measurably increase monitoring costs over those associated with the proposed Recreation Plan.

In total, our recommended Recreation Plan would have an estimated levelized annual cost of about \$2,965,000, which is about \$210,000 more than the estimated levelized annual cost of NID's proposed Recreation Plan. We conclude that the benefits of our recommended plan would be worth the cost because it would: (1) address project effects and provide for project visitor use such as providing project trails and modifying recreation facilities; (2) provide a comprehensive recreation management plan that the Commission can use to determine compliance; (3) protect natural resources at recreation developments; and (4) enhance recreation enjoyment for project visitors.

In addition to the proposed modification discussed above, there are provisions that we do not recommend. In its 4(e) condition 41, the Forest Service specifies the following measures related to non-project facilities that lie outside the project boundary: (1) improvements at the Jackson Creek campground; (2) creation of Canyon Creek dispersed campsites; and (3) additional facilities at Lang's Crossing. Jackson Creek is an undeveloped campground located on NFS land outside the project boundary near Jackson Creek. The Langs Crossing area is also located outside the project boundary approximately 1 mile below Spaulding dam near the Bowman Road (Forest Service Road 18) crossing of the South Yuba River. Both facilities are outside the project boundary and do not provide access to project facilities. While Canyon Creek is within the project boundary, there are currently no dispersed sites within the project boundary. However there are six to eight existing dispersed campsites to the east of the Canyon Creek campground outside of the FERC boundary. Based on the information available to us, we do not recommend these specific measures be included in the recreation plan.

We do not recommend the Forest Service's specified reconstruction of the existing boat ramp at Pass Creek boat launch within 15 years. Our current recommendation to extend/modify the existing launch to provide low-water boat launching would ensure that the boat ramp is in good condition and maintained by NID; therefore, reconstruction of this boat ramp would not be needed within 15 years. We also do not recommend reconstruction of Findley campground within 10 years because the facility is sufficient to meet the current low to moderate use levels. Recreation monitoring, as recommended by staff, would allow NID and the agencies to determine the need for campground reconstruction in the future based on facility condition and future use.

We do not recommend the expansion of Bowman campground by 20 sites. Current use at the Bowman campground is generally low and there is no demonstrated need for additional sites. Although use data were not provided for this site, dispersed camping is an established use at Bowman Lake. Improving some of the dispersed primitive campsites and eliminating some, but not all, would consolidate camping use in areas most suited for camping and reduce human effects. Consolidation of camping/campsites into designated campground areas would also reduce shoreline impacts associated with dispersed camping at undesignated and unimproved sites, such as vegetation impacts and shoreline erosion.

We do not recommend certain improvement measures as specified in Forest Service condition 41 for trails and trailheads. As discussed in section 3.3.5.2, *Recreational Resources, Environmental Effects*, many of the trails in the project area are non-project trails outside the project boundary. In certain locations, trailheads for these non-project trails are located within the project boundary, even if the trail itself is not a project-related facility. We recommend that NID continue to maintain these existing trailhead facilities that lie within the project boundary or are associated with project facilities in a safe and useful condition, but we do not recommend major modifications or enhancements to these facilities, nor do we recommend the construction of new trails that connect Forest Service trailheads outside of the

project boundary to project facilities. Therefore, we do not recommend construction of the trails at Sawmill Lake or French Lake, except for a walkway across the Sawmill spillway and a primitive trail from Faucherie Lake to Sawmill Lake, which would connect two project reservoirs.

We do not recommend the requirement that NID cooperate with trail planners on the development and maintenance of the Bear River trail or related trail facilities. The bulk of the Bear River trail would be located outside the project boundary, primarily on Forest Service lands, and would not serve a project purpose. Therefore, we conclude that this trail is not necessary for project purposes.

Forest Service condition 41 specifies and BLM condition 37 specifies that NID develop a plan to address the costs to the Forest Service for managing project-related recreation, fire management, resource protection, and law enforcement. NID is responsible for operating and maintaining project-related recreation facilities. Further, NID already provides this funding support to help offset these costs through land use fees and county taxes. If NID were to develop a plan to include additional funding to support these activities, the Commission would have no way of ensuring any funding provided to the agencies for law enforcement would be used for project purposes. Therefore, we do not recommend that NID be required to prepare a plan that identifies the cost to the Forest Service for fire management, resource protection, or law enforcement.

Finally, we do recommend that NID share responsibility for providing recreational facilities at Langs Crossing, as specified by the Forest Service. Langs Crossing area is located outside the project boundary approximately 1 mile below Spaulding dam and does not serve a project purpose nor does it provide access to project facilities. Therefore, given the lack of nexus it would not be appropriate to require NID to provide facilities related to this area.

Recreation Flow Information

Information on recreational flow is needed on a year-round basis to support a growing demand for whitewater boating activities, even during the winter. NID proposes to provide streamflow information to the public from May 1 through November 30. We recommend that NID provide daily average streamflow information to the public for the proposed locations on a year-round basis. NID is currently providing year-round flow information, and it is appropriate to continue. We estimate the cost of providing year-round flow information to be \$4,000 on a levelized annual basis, which is the same cost as providing the information on a seasonal (May to November) basis.

Fish Stocking Plan

Angling is one of the primary recreational activities associated with the Yuba-Bear Project. Although natural reproduction occurs in some of the project waters, stocking is necessary to sustain populations of game fish in waters with high angler usage. NID proposes to pay California Fish and Wildlife annually for the stocking of up to 20,000 trout fry and 25,000 kokanee fry in Bowman Lake (\$75,000) and the stocking of up to 10,000 catchable rainbow trout, 10,000 catchable brown trout, and 25,000 kokanee fry in Rollins (\$40,000). California Fish and Wildlife's recommendation 17 and the Forest Service's 10(a) recommendation 9 recommend NID fund the stocking of fish in Bowman, Faucherie, French, and Sawmill Lakes, and Jackson Meadows and Rollins reservoirs on an annual basis. We estimate the cost would be about \$231,000. Maintaining the existing stocking numbers in those reservoirs such as Rollins and Jackson Meadows reservoirs with high recreational use and high angling pressure would help meet the estimated future demand for angling at the project for the term of the a new license. However, stocking fish at only those reservoirs, as proposed by NID, is insufficient to meet the needs of anglers at other project waters. Faucherie and Bowman Lakes are used moderately by anglers with a little over half of the visitors participating in angling at Faucherie Lake and approximately half of the visitors at Bowman Lake. In a response letter dated September 14, 2012, to California Fish and

Wildlife and Forest Service, NID stated it would be appropriate to reimburse California Fish and Wildlife for the annual fish stocking in Jackson Meadows, Bowman, and Rollins reservoirs up to the maximum levels included in the agencies' recommendations; however, stocking in French, Faucherie, and Sawmill Lakes should occur no more than once every 3 years

To provide adequate fish stocking at the project, we recommend that NID prepare and implement a fish stocking plan for the Yuba-Bear Project. The plan would be developed in consultation with California Fish and Wildlife, the Forest Service, and BLM, and filed for Commission approval. The plan should address stocking in Bowman Lake, Rollins reservoir, Faucherie Lake, and Jackson Meadows reservoir, but would also include provisions for stocking fish in additional project reservoirs based on changes in recreational use, collected from recreation use monitoring, and angling pressure over the term of the new license. The plan would provide the means for a coordinated fish stocking program with the flexibility to increase or decrease stocking numbers, change fish stocking sizes, and change the frequency of stocking a particular reservoir over the term of a new license. A fish stocking plan that also includes annual consultation would help address any changes in California Fish and Wildlife fish stocking management targets and the availability of hatchery fish. A fish stocking plan would benefit project visitors and would be worth the estimated levelized annual cost of \$231,000.

5.2.2.3 Measures Not Recommended by Staff

Some of the measures proposed by NID and recommended by other interested parties would not contribute to the best comprehensive use of the Yuba River and Bear River water resources, do not exhibit sufficient nexus to the project's environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Middle Yuba River Block Flow Release for Water Temperature Management

Our analysis indicates that the proposed minimum streamflows (section 3.3.2.2.2, *Instream Flows*) for the Middle Yuba River below Milton diversion dam are likely to ensure maintenance of water temperature at less than 20°C between Milton diversion dam and the confluence of Wolf Creek, which would benefit resident rainbow trout without adversely affecting the population of foothill yellow-legged frog. The additional *Block Flows* recommended by California Fish and Wildlife and Foothill Water Network may further reduce water temperature in the reach from 20°C to 19°C above Wolf Creek confluence but could result in an uncertain and potentially adverse effect on various aquatic resource species. Cooler water temperatures could inhibit natural development rates of early life stages of the foothill yellow-legged frog. Given that the existing trout fishery is considered to be of "remarkably good quality" under the existing license conditions and proposed increased minimum stream flows are likely to improve and enhance existing conditions, the risk of implementing the *Block Flow* condition to foothill yellow-legged frog does not appear to be adequately balanced by the benefit to other aquatic resources. In addition, the water temperature model indicates that the *Block Flow* proposal would reduce water temperatures below what would be expected under unregulated conditions. Monitoring of the effects of proposed minimum streamflows on resident species of concern would provide the data necessary to evaluate and document the benefits of increased minimum streamflows and ensure that foothill yellow-legged frog populations are not adversely affected. We conclude that 20°C would be a more appropriate temperature goal for the Middle Yuba River above Wolf Creek for balancing aquatic resource needs; maintaining 20°C at Wolf Creek would likely maintain adequate temperatures for foothill yellow-legged frog in the vicinity of their upstream extent near RM 30. Therefore, we do not recommend the *Block Flow* proposal for the Middle Yuba River below Milton diversion dam as the benefits do not outweigh the costs.

Mercury Bioaccumulation Monitoring

Forest Service condition 35 specifies that NID implement a mercury bioaccumulation monitoring program. NID's relicensing studies documented high concentrations of methylmercury in fish from project waters. Elevated methylmercury levels in fish tissue have been reported throughout the Sierra Nevada region. NID does not propose any substantive changes to reservoir levels or frequency and magnitude of channel modifying flows. Therefore, we do not expect any changes in methylmercury concentration levels in sportfish as a result of project operations. Although the information generated from implementation of this plan would provide appropriate agencies with data on whether or not to issue health advisories for anglers using project waters, bioaccumulation of mercury is not a project-related effect. Consequently, we conclude that the estimated levelized annual cost of \$17,840 for implementation of this plan is not warranted.

Recommendations to Support Reintroduction of Spring-run Chinook Salmon and Central Valley Steelhead to Middle Yuba River and South Yuba above Englebright dam

Actions to reintroduce Central Valley spring Chinook salmon and Central Valley steelhead upstream of the Corps' Daguerre Point and Englebright dams on the Yuba River have been identified in NMFS' Public Draft Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead (Draft Recovery Plan) (NMFS, 2009b). NMFS included a measure in its Biological Opinion (NMFS, 2012) for the operation and maintenance of the Corps of Engineers' Daguerre Point and Englebright dams to reintroduce spring-run Chinook salmon and/or Central Valley steelhead to the upper Yuba River above Englebright dam. NMFS anticipates that reintroduction of these anadromous fish species would take place within the term of a new license issued for the Yuba-Bear Project.

NMFS provided four environmental recommendations for the Yuba-Bear Project to support future reintroduction of these spring-run Chinook salmon and/or steelhead in the upper Yuba River (section 3.3.2.2.2, *Instream Flows*; section 3.3.2.2.8, *Aquatic Biota*). Two of these recommendations (recommendations 3 and 4) each include 4 subparts. We consider two additional NMFS recommendations (recommendations 1 and 2) to be administrative and do not evaluate them in this draft EIS.

NMFS intention is for these recommendations to be implemented at a future time should steelhead and/or Chinook salmon be reintroduced into upper Yuba River areas influenced by the project. NMFS recommends that the Yuba-Bear Project operate under the new license in a manner consistent with the Biological Opinion.

This Biological Opinion for Daguerre Point and Englebright dams is undergoing revision at this time, and no specific schedule for the reintroduction of these species has been suggested. We note that there are considerable uncertainties regarding the viability and implementation program set forth in the draft recovery plan (NMFS, 2009a) and the Central Valley Project and State Water Project biological opinion (NMFS, 2009b). NMFS (2009b) states that the concept of collection of outmigrating juveniles at facilities at the head of reservoirs to ensure safe and timely downstream passage of juvenile and post-spawn steelhead is untested, and multiple concepts may need to be tested simultaneously. To our knowledge, no federal funding for any or all of these tasks has been proposed. Thus, the implementation of a long-term reintroduction program for either species, particularly in the upper Yuba River, is, at best, uncertain and NMFS recommendations are premature.

Bullfrog Eradication

FWS recommended that NID develop a bullfrog eradication plan for all project lakes, reservoirs, and impoundment areas to enhance populations of CRLFs, FYLFs, and other frog species. FWS has not provided any specific evidence of how the project contributes to the presence of in the project area.

As discussed in section 3.3.3.2.2, *Wildlife*, development of a bullfrog eradication program for the project would be impracticable and ineffective. Bullfrogs would likely continue to recolonize the project area from adjacent suitable habitats. Further, bullfrog control has generally been restricted to small ponds that can be drained; control of large reservoirs and rivers has not been shown to be practical (Adams and Pearl, 2007).

Although it is difficult to determine the cost of an eradication program, it is likely to exceed \$50,000 per year. We do not believe the benefits would be worth the cost.

Carnivore Management Plan

FWS recommended that NID develop a wolverine and fisher management plan to protect these species within designated carnivore management area.

There are no designated wolverine carnivore management area that overlaps the project area. Although Pacific fisher designated carnivore management areas overlap with some of the project areas, the existing populations of Pacific fisher do not overlap with the project boundary. FWS has not provided any evidence of potential project effects to these species. The development of a management plan, as recommended by FWS, would add limited protection to this species due to its lack of use of the available habitat within the project boundary. If issues arise concerning potential project impacts, they can be addressed through the annual consultation meetings. Therefore, we do not recommend development of a carnivore management plan.

Watershed Restoration Plan

California Fish and Wildlife recommends that NID develop a watershed restoration plan that describes the slopes below open canals and project facilities by existing erosion condition; describes the methods to resolve slopes that have been and would be damaged by past and future breaches of the open canal system; provides an inspection schedule to identify potential failures that would cause releases of water and subsequent damage to watershed resources; and provides a plan to notify California Fish and Wildlife if damage to watershed resources occurs and to describe the actions that would be taken to repair and restore the damaged site. Forest Service condition 26 and BLM condition 25 specify that PG&E develop a Slope Assessment and Facility Release Access Plan to address erosion potential at discharge points from project facilities including past canal breaches.

NID proposes an Erosion Control and Slope Maintenance Plan that includes similar provisions to those recommended by California Fish and Wildlife. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

NID provided an alternative condition that would require implementation of the detailed Erosion Control and Slope Maintenance Plan submitted on August 30, 2012. This plan addresses both project-wide erosion control and sedimentation management needs and measures and specific issues related to steep slopes at project facilities and drainage structures.

NID's Erosion Control and Slope Maintenance Plan addresses and integrates all of the primary issues and concerns identified by the Forest Service, BLM, and California Fish and Wildlife under a single comprehensive plan.

Implementation of a watershed restoration measures recommended by California Fish and Wildlife would alleviate existing erosion damage caused by historical canal operations and spills and minimize any future damage resulting from operations under the new license. We conclude, however, that NID's Erosion Control and Slope Maintenance Plan contains similar provisions that are adequate to provide slope protection. The estimated annualized cost to integrate California Fish and Wildlife's recommendation with NID's Erosion Control and Slope Maintenance Plan is \$110,000 and the improvement of NID's plan is not worth this cost.

Protection of Special-Status Species

Forest Service conditions 12 and 34 and BLM conditions 20 and 52 specify that NID submit a biological evaluation for approval by appropriate agencies prior to construction activities that may affect special status species or critical habitat. California Fish and Wildlife makes a similar recommendation. However, before construction of any new project feature not addressed in this EIS could occur, NID would first need to file with the Commission an application to amend its license. If appropriate, a biological evaluation or, if a federally listed species could be involved, a biological assessment for special status species, would be developed as part of the license amendment proceeding. Consequently, although the intent of this measure would be addressed through the amendment process, we find that there is no need to include this measure as a condition of a new license for this project.

Paleontological Resources

Forest Service 4(e) condition 43 and BLM 4(e) condition 21 specify and California Fish and Wildlife 10(a) measure 19 recommends that paleontological resources should be included in the HPMP. NID has not included management measures for paleontological resources in the HPMP. Paleontological resources are not cultural resources and, thus, are not eligible for listing on the National Register and cannot be addressed in the HPMP pursuant to section 106. The Commission has no jurisdiction over NID to enforce these 4(e) conditions to protect paleontological resources. Paleontological resources are protected by California statute (e.g., Public Resources Code Section 5097.5 (a), Removal or Destruction; Prohibition), appendix G to the CEQA Guidelines that was revised in 2009 to include an assessment of project effects on paleontological resources, and the Paleontological Resources Preservation Act (P.L. 111-011) Omnibus Public Land Management Act of 2009 Subtitle D--Paleontological Resources Preservation. It is the responsibility of the federal land manager to carry out such protective measures. In the case of a new license for the project, NID would be responsible for consulting with the Forest Service and BLM under these circumstances.

Inadvertent Discoveries

Forest Service 4(e) condition 43 and BLM 4(e) condition 21 specify and California Fish and Wildlife 10(a) measure 19 recommends that in situations when inadvertent discoveries are found on Forest Service, BLM, or California Fish and Wildlife lands, NID would not resume work on ground-disturbing activities until written approval from the Forest Service, BLM, or California Fish and Wildlife is received. NID has plans for handling inadvertent discoveries in the HPMP that do not require it to receive written approval from the Forest Service or BLM to proceed following a discovery. These plans have been reviewed and commented on by the Forest Service, BLM, and tribes. NID's alternative 4(e) conditions for noticing, consulting, and documenting cultural resources involving inadvertent discoveries would adequately protect historic properties from project-related effects. Therefore, we conclude that the process NID has already provided in its HPMP is appropriate.

5.2.3 Unavoidable Adverse Impacts

The continued operation of the Yuba-Bear Project would result in some minor unavoidable adverse effects on geologic, soil, aquatic, terrestrial, and visual resources. The geologic and soil resources effects could include some minor continued erosion associated with project operation and renovation of recreational facilities and interruption of sediment transport at project reservoirs. Most of these effects would be reduced by the proposed resources enhancement measures, including: (1) implementation of the Erosion and Sediment Control Management plan; and (2) development and implementation of an LWD management plan.

Aquatic communities have developed and adapted to the high level of natural flow variability in western Sierra streams. Reduced flow variability as a result of historical project operations could have resulted in shifts in community composition, diversity, and resilience. Proposed minimum flow and spill cessation measures would improve seasonal and inter-annual flow variability to better mimic natural flow variability in some project affected reaches; however, inter-basin transfer of water via project facilities to meet water delivery commitments and contracts under legally established water rights would continue to reduce overall natural flow and variability in many project reaches.

Discharges from project canals augment natural flow in some project reaches (e.g., Bowman-Spaulding diversion conduit). When these canals are taken out of service for maintenance or in the event of an emergency and flow ceases, flow in these reaches returns to natural flow levels, which could be zero flow at some locations and during some months. In other reaches, canal outages can result in spills of atypical magnitude through the reach. Proposed measures would reduce, but not eliminate the outage associated flow shifts.

Some fish entrained into project conduits, canals, and flumes are subject to stress, injury, and mortality when flow ceases during outages. Proposed fish protection and rescue measures have been designed to reduce potential mortality during these periods. Some minor levels of mortality would still be likely to occur associated with capture, handling, and transport of fish collected in open canal structures or in closed conduits and tunnels where fish rescue protocols cannot be safely implemented.

As a result of historical environmental damage associated with mining and mineral extraction, bioaccumulation of mercury in fish and other aquatic organisms is expected to continue long into the future and throughout the period of the new license. We do not expect project operations under the new license conditions to affect the rate of mercury suspension, transport, or bioaccumulation.

For terrestrial resources, unavoidable adverse effects could include loss of vegetation and wildlife habitat from the construction of the Rollins upgrade or new or rehabilitated recreation facilities that require permanent removal of vegetation. Effects to vegetation and wildlife habitat would be reduced by implementation of the Integrated Vegetation Management Plan.

Any construction related to the proposed Rollins upgrade or new or rehabilitated recreation facilities would result in short-term impacts to the visual quality of the project area. Visual impacts would ultimately be mitigated by the implementation of the Visual Resource Management Plan.

5.2.4 Summary of 10(j) Recommendations and 4(e) Conditions

5.2.4.1 Fish and Wildlife Agency Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by

the project. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: NMFS (letter filed July 31, 2012) and California Fish and Wildlife (letter filed July 30, 2012).

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. Table 5-5 lists the federal and state recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Of the 72 recommendations and associated subparts submitted by California Fish and Wildlife, we consider 31 to be within the scope of section 10(j). Of those 31 recommendations, we wholly include 25, include 4 in part, and do not include 2. We discuss the reasons for not including those recommendations in section 5.1.2, *Comprehensive Development and Recommended Alternative*. Table 5-5 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). Of the 41 recommendations that are not within the scope of section 10(j), 23 are administrative recommendations, identical to some of the Forest Service's 4(e) administrative conditions; the other 20 are considered 10(a) recommendations. Of the administrative conditions, we only address the following recommendations in our draft EIS: condition 1: *Consultation*, condition 12: *Protection of Forest Service Special Status Species*, condition 16: *Pesticide Use Restrictions on NFS Lands*, condition 23: *Hazardous Substance Plan*, condition 27: *Slope Stability Plan*, and condition 28: *Watershed Restoration Plan*.

NMFS submitted two recommendations (including subparts) concerning LWD that are within the scope of section 10(j). NMFS also submitted six recommendations (including subparts) concerning future reintroduction of spring-run Chinook salmon and/or Central Valley steelhead in the South Yuba River upstream of Englebright dam. These recommendations do not fall within the scope of section 10(j) because they depend upon a future action. We do not recommend adoption of any of these eight recommendations. NMFS also filed two recommendations with regard to consistency with the biological opinion on Corps of Engineers actions and formal consultation under the ESA (recommendations 1 and 2) that we consider administrative and are not addressed in our draft EIS.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
1	Consultation	California Fish and Wildlife (recommendation 1)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$15,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
2	Annual employee training	California Fish and Wildlife (recommendation 1.1)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$20,000	Yes
3	Coordinated operation plan	California Fish and Wildlife (recommendation 1.2)	Yes	\$4,000	Yes
4	Determine Water Year Type in February, March, April, May, and October of each year based on unimpaired runoff in Yuba River at Smartsville as set in the California DWR Bulletin 120.	California Fish and Wildlife (recommendation 2.1)	Yes	\$54,000	Yes
5	Provide higher Minimum Streamflows in 7 project-affected reaches, new minimum streamflows in 9 project-affected reaches, and the same minimum streamflows in 1 project-affected reach.	California Fish and Wildlife (recommendation 2.2)	Yes	\$54,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
6	Canal Outage – Notify licensing participants at the annual consultation meeting of all annual planned and non-routine planned canal outages. Implement modified minimum streamflows for the first 30 days of the outage.	California Fish and Wildlife (recommendation 2.3)	Yes	\$54,000	Yes
7	Flow Setting and Winter Flow Adjustment – Implement adjusted minimum streamflows in the Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam from November to January and below Wilson Creek diversion dam from November 1 to the earliest date to access the facility safely.	California Fish and Wildlife (recommendation 2.4 and 2.5)	Yes	\$54,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
8	Chicago Park powerhouse Motoring during Outages – Avoid non-routine outages at Chicago Park powerhouse from May 1 to September 15 and motor the powerhouse unit when it is not generating. Motor the powerhouse until spill flows from Dutch Flat afterbay reach Chicago Park tailrace.	California Fish and Wildlife (recommendation 2.6)	Yes	\$54,000	Yes
9	Spill Cessation and Minimization of Flow Fluctuations in Middle Yuba River, Canyon Creek, and Bear River – Implement spill cessation schedule at Milton diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay dam to avoid short-term, high-flow fluctuations in the downstream reaches.	California Fish and Wildlife (recommendation 2.7)	Yes	\$54,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
10	<i>Block Flows</i> for Middle Yuba River – Release up to an additional 2,500 acre-feet of water to the Middle Yuba River below Milton diversion dam between June 15 and September 15 in all water year types in order to maintain water temperatures below 19°C. Establish a Middle Yuba River Water Temperature Operations Group.	California Fish and Wildlife (recommendation 2.8)	Yes	\$81,000	No, the <i>Block Flow</i> proposal could adversely affect foothill yellow-legged frog habitat.
11	Rollins reservoir Elevation Control – Manage the elevation of Rollins reservoir within the top 2 or 3 feet by adjusting the discharge (greater than downstream water supply demand) from the reservoir into the Bear River based on inflow to Rollins reservoir that are in order to eliminate rapid fluctuations in the Bear River below Rollins dam.	California Fish and Wildlife (recommendation 2.9)	Yes	\$54,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
12	Large Woody Debris Management Plan – Survey a 10-mile reach of Bear River below Rollins dam during the fifth year of the license and report findings of LWD. If there are less than 2.4 pieces per 100 meters, place additional material. Conduct an LWD survey every 5 years.	California Fish and Wildlife (recommendation 2.10)	Yes	\$64,000	Yes
13	Steephollow Creek Foothill Yellow-legged Frog Monitoring – Conduct baseline monitoring of foothill yellow-legged frog in Steephollow Creek in first 3 years of license to assess effects of spills from Chicago Park conduit; spill-event-based (>100 cfs, April 1-June 15; >300 cfs, June 16-September 15) monitoring in years 2 and 3.	California Fish and Wildlife (recommendation 2.11)	Yes	\$17,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
14	Milton-Bowman Conduit Fish Entrainment Plan – Develop a fish entrainment reduction plan including a fish screen at Milton-Bowman diversion dam that includes a design, schedule for implementation, cost, and monitoring of screen facility.	California Fish and Wildlife (recommendation 2.12)	Yes	\$245,000	Yes
15	Establish an ecological group to assist with the implementation of license measures, monitoring plans, and the review and evaluation of monitoring data and facility modifications.	California Fish and Wildlife (recommendation 2.13)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$50,000	Yes, but the terms of this recommendation would be fulfilled through the annual consultation process.
16	Implement a Canal Fish Rescue Plan.	California Fish and Wildlife (recommendation 3)	Yes	\$52,000	Yes
17	Gaging Plan – Finalize the gaging plan submitted with the amended final license application.	California Fish and Wildlife (recommendation 4)	Yes	\$95,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
18	Non-Native Invasive Aquatic Species Management Plan – Develop a plan to address invasive species such as New Zealand mudsnail, Quagga mussels, and zebra mussels.	California Fish and Wildlife (recommendation 6)	Yes	\$17,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan on August 30, 2012 that includes measures to address invasive aquatic species.
19	Implement an integrated vegetation and non-native invasive species management plan.	California Fish and Wildlife (recommendation 7.1)	Yes	\$91,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan filed on August 30, 2012.
20	Monitor animal losses in all project canals, including recording details of each animal mortality occurrence.	California Fish and Wildlife (recommendation 7.2)	Yes	\$10,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
21	Consult with California Fish and Wildlife when replacing wildlife escape and wildlife crossing facilities regarding specifications and design.	California Fish and Wildlife (recommendation 7.3)	Yes	\$1,000	Yes
22	Maintain one existing wildlife crossing structure in the Bowman-Spaulding canal (canal mile 5.8), and either construct one new crossing or retrofit the existing crossing at canal mile 1.5; annually monitor and report crossing conditions and maintenance or repairs.	California Fish and Wildlife (recommendation 7.4)	Yes	\$23,000	Yes, consistent with Forest Service condition 34.
23	Implement Bald Eagle Management Plan.	California Fish and Wildlife (recommendation 7.5)	Yes	\$5,000	Yes, we recommend implementation of NID's bald eagle management plan filed on August 30, 2012.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
24	Submit a biological evaluation, for approval by appropriate agencies, prior to construction activities on NFS or BLM lands that may affect special status species or critical habitat.	California Fish and Wildlife (recommendation 7.6)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. Biological evaluation is already required prior to new construction.
25	Annually review current lists of special-status species that might occur in project area and that may be affected by project operations, and suggested procedure to follow if special-status species is detected.	California Fish and Wildlife (recommendation 7.7)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$16,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
26	Annually record all incidental observations and details, by operation staff, of bird collision/electrocutions at the Bowman-Spaulding transmission line; replace poles according to the <i>Avian Protection on Power Lines: The State of the Art in 2006</i> ; conduct evaluation of power poles to determine consistency with <i>Avian Protection on Power Lines</i> and replace or retrofit non-compliant poles.	California Fish and Wildlife (recommendation 7.8)	Yes.	\$4,000 (use raptor-safe design and retrofit problem lines); \$7,000 (evaluate lines); unknown (correct non-compliant poles)	Yes, but with exception of evaluation of existing power poles and requirement to correct non-compliant poles.
27	Document all bat roosts within project buildings, dams, or other structures that may be used as roosting structure; place humane exclusion devices in structure with bats present; perform annual inspection of exclusion devices and structures.	California Fish and Wildlife (recommendation 7.9)	Yes	\$3,000	Yes
28	Develop and implement a stabilization plan for Clear and Trap Creeks	California Fish and Wildlife (recommendation 7.10)	Yes	\$211,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
29	Establish a monitoring program for aquatic species, non-native invasive species, sensitive species, recreation, bear management, and sensitive raptor species.	California Fish and Wildlife (recommendation 8)	Yes	\$236,000	Yes, we recommend implementation of NID's Aquatic Monitoring Plan filed on August 30, 2012 for aquatic species, including foothill yellow-legged frog and western pond turtle, and note that other monitoring is included in resource-specific plans.
30	Prepare an LWD management plan in consultation with the appropriate agencies that identifies the locations LWD would be collected, describes the options for moving LWD below project facilities, and identifies placement locations.	California Fish and Wildlife (recommendation 9)	Yes	\$15,000	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
31	Schedule and facilitate a review meeting when the maintenance schedule, water year forecast, and reservoir level forecasts are finalized to discuss the implementation of minimum streamflows and reservoir related conditions, results of monitoring, and other issues related to preserving and protection ecological values.	California Fish and Wildlife (recommendation 10)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$15,000	Yes, however, we suggest that this consultation would be accomplished during the annual consultation meeting.
32	Develop and implement a plan to evaluate the penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when release points are used.	California Fish and Wildlife (recommendation 11)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$6,000	Yes, key provisions of this condition included under the Forest Service condition 26, Slope Assessment and Facility Release Access Plan.
33	Submit a biological evaluation, for approval by appropriate agencies, prior to construction activities on NFS or BLM lands that may affect special status species or critical habitat.	California Fish and Wildlife (recommendation 12)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. Biological evaluation is already required prior to new construction.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
34	Recreation Survey, Monitoring, Reporting, and Future Development Triggers.	California Fish and Wildlife (recommendation 12)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in the cost for the Recreation Plan (California Fish and Wildlife recommendation 16)	Yes
35	Annual Recreation Coordination Meeting: Each year during the term of the license, arrange to meet with interested agencies for an annual coordination meeting to discuss the measures needed to ensure public safety, and protection and use of the recreation facilities.	California Fish and Wildlife (measure 15)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in the cost for the Recreation Plan (California Fish and Wildlife measure 16)	Yes
36	Restrict pesticide use on federal lands without prior written approval of appropriate agencies; includes details and restriction on allowed pesticides.	California Fish and Wildlife (recommendation 16)	Yes	\$0	Yes

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
37	Recreation Plan: Upon issuance of the license, implement the Recreation Plan as approved by the Commission. Recommendation includes site-specific recommendations for recreation facility modifications and improvements.	California Fish and Wildlife (recommendation 16)	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$2,965,000	Yes, we recommend implementation of NID's revised Recreation Plan filed on August 30, 2012, as modified by staff.
38	Reservoir Fish Stocking: Consult with California Fish and Wildlife annually to establish (1) stocking targets and species; (2) additional reservoirs for stocking (i.e., Faucherie, French Lake, Jackson Meadows, Sawmill); and (3) not-to-exceed stocking targets. NID could acquire the fish directly from fish hatcheries. The recommendation does not specify species to be stocked.	California Fish and Wildlife (recommendation 17)	Yes	\$354,000	Yes, but modified to develop a fish stocking plan that includes stocking Rollins reservoir, Jackson Meadows reservoir, Bowman Lake, and Faucherie Lake.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
39	Develop and implement an Erosion and Sediment Control and Management Plan	California Fish and Wildlife (recommendation 22)	Yes	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
40	Develop a Hazardous Substances Plan.	California Fish and Wildlife (recommendation 23)	Yes	\$4,000	Yes
41	Develop and implement a Slope Stability Plan	California Fish and Wildlife (recommendation 27)	Yes	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
42	Develop and implement a Watershed Restoration Plan	California Fish and Wildlife (recommendation 28)	Yes	\$101,000	No, but NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012 addresses major issues.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
43	Implement minimum flows below Milton diversion dam (10-200 cfs depending on week/month). The flows are based on the 7-day average water temperature at the Plumbago Road crossing.	NMFS (recommendation 3.1)	No, because it depends upon a future action.	\$45,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
44	Implement minimum flows below Bowman Lake (15-75 cfs) and Lake Spaulding (25-75 cfs) to maintain 19°C 7-day mean water temperature at the Poorman Creek confluence with the South Yuba River.	NMFS (recommendation 4.1)	No, because it depends upon a future action.	\$72,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
45	Develop and implement an LWD Management Plan for South Yuba River at Lake Spaulding dam for implementation when anadromous species are reintroduced above Englebright dam.	NMFS (recommendations 3.2.1 and 4.2.1)	No, because it depends upon a future action.		No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
46	Develop and implement an interim LWD measure for anadromous fish to allow passage/placement of LWD in Middle Yuba River below Milton diversion dam and in Canyon Creek below Bowman-Spaulding diversion dam. Deliver 40 cubic meters of LWD per year to the Middle Yuba River Yuba River and 30 cubic meters to South Yuba River below Canyon Creek.	NMFS (recommendations 3.2.2 and 4.2.2)	No, because it depends upon a future action.	\$72,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur. Forest Service condition 36 includes survey of LWD conditions and would address movement of LWD downstream in Middle Yuba River below Milton diversion dam and in Canyon Creek below Bowman-Spaulding diversion dam through development and implementation of a specific LWD plan, if necessary.

Table 5-5. Fish and wildlife agency recommendations for the Yuba-Bear Project. (Source: staff)

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
47	Implement minimum flows below Milton diversion dam (10-30 cfs depending on week/month) if winter steelhead are introduced in the absence of spring-run Chinook salmon.	NMFS (recommendation 5.1)	No, because it depends upon a future action.	\$39,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.
48	Implement minimum flows below Bowman Lake dam (25-50 cfs) and Lake Spaulding dam (15-30 cfs) for central valley steelhead in the absence of Chinook salmon reintroduction. Maintain 20°C 7-day mean water temperature at the Poorman Creek confluence with the South Yuba River.	NMFS (recommendation 6.1)	No, because it depends upon a future action.	\$72,000	No, the recommendation is premature because it depends upon future reintroduction of anadromous fish that may never occur.

5.2.4.2 Land Management 4(e) Conditions

In section 2.2.4.2, *Modifications to Applicants' Proposals—Mandatory Conditions, Yuba-Bear Project*, we list the 4(e) conditions submitted by the Forest Service and BLM, and we note that section 4(e) of the FPA provides that any license issued by the Commission “for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation.” Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our staff alternative.

Of the Forest Service’s 46 section 4(e) conditions, we consider 23 of the conditions (conditions 2 through 11, 13, 14, 15, 17 through 22, 24, 25, 32 and 46) to be administrative or legal in nature and not specific environmental measures. Of BLM’s 66 section 4(e) conditions, we consider 23 of the conditions (conditions 14, 43 through 50, 53, 54, 55, and 57 through 66) to be administrative or legal in nature and

not specific environmental measures. We do not analyze the administrative conditions in this draft EIS. Table 5-6 summarizes our conclusions with respect to the 66 4(e) conditions that we consider to be environmental measures. We include wholly in the staff alternative 17 Forest Service conditions and 37 BLM conditions as specified by the agencies, modify 5 Forest Service conditions and 5 BLM conditions to adjust the scope of the measure, and do not recommend 1 Forest Service condition and 2 BLM condition; the measures not adopted in total are discussed in more detail in section 5.2.2, *Comprehensive Development and Recommended Alternative*.

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
1	Consultation	Forest Service	\$15,000	Yes
12	Protection of Forest Service Special Status Species (also included in condition 34)	Forest Service	\$0	No, a biological evaluation would be considered during any project construction activity. No additional condition is necessary.
16	Pesticide-Use Restrictions on National Forest System Lands	Forest Service	\$0	Yes
23	Hazardous Substances Plan	Forest Service	\$4,000	Yes
26	Slope assessment and facility release point plan	Forest Service	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
27	Erosion and Sediment Control and Management	Forest Service	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
28	Employee training	Forest Service	\$20,000	Yes
28	Coordinated operations plan	Forest Service	\$4,000	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
29	Water year type	Forest Service	\$54,000	Yes, with modification second year of back to back critically dry water years would be considered extreme critically dry water year.
29	Minimum streamflows in 13 project-affected reaches	Forest Service	\$54,000	Yes
29	Canal outages affecting 4 project reaches	Forest Service	\$54,000	Yes
29	Overwinter minimum streamflow adjustments in Middle Yuba River below Milton diversion dam and Canyon Creek below Bowman-Spaulding diversion dam	Forest Service	\$54,000	Yes
29	Wilson diversion dam flow setting	Forest Service	\$54,000	Yes
29	Spill cessation in Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman-Spaulding diversion dam, and Bear River below Dutch Flat afterbay dam	Forest Service	\$54,000	Yes
29	Mitigation for entrainment into Milton-Bowman conduit	Forest Service	\$245,000	Yes
29	Ecological group	Forest Service	\$50,000	Yes, but the terms of this recommendation would be fulfilled through the annual consultation process.
30	Canal outages fish rescue plan for 4 project canals	Forest Service	\$52,000	Yes
31	Gaging plan	Forest Service	\$95,000	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
33	Aquatic invasive species management	Forest Service	\$17,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan filed on August 30, 2012 that includes measures to address invasive aquatic species.
34	Terrestrial Protective Measure: Vegetation and Non-Native Invasive Plant Management Plan	Forest Service	\$91,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan filed on August 30, 2012.
34	Terrestrial Protective Measure: Monitor Animal Losses in Project Canals	Forest Service	\$10,000	Yes
34	Terrestrial Protective Measure: Replacement of Wildlife Escape and Wildlife Crossing Facilities	Forest Service	\$1,000	Yes
34	Terrestrial Protective Measures: Wildlife Crossings — Bowman-Spaulding Canal	Forest Service	\$22,000	Yes
34	Terrestrial Protective Measure: Bald Eagle Management Plan	Forest Service	\$5,000	Yes, we recommend implementation of NID's Bald Eagle Management Plan filed on August 30, 2012.
34	Terrestrial Protective Measure: Special Status Species (same as condition 12)	Forest Service	\$0	No, a biological evaluation would be considered during any project construction activity. No additional condition is necessary.

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
34	Terrestrial Protective Measures: Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land	Forest Service	\$16,000	Yes
34	Terrestrial Protective Measure: Project Powerlines	Forest Service	\$3,000	Yes
34	Terrestrial Protective Measure: Raptor Collisions	Forest Service	\$1,000	Yes
34	Terrestrial Protective Measure: Bat Management	Forest Service	\$3,000	Yes
35	Monitoring Program	Forest Service	\$80,000	Yes, we recommend implementation of NID's Aquatic Monitoring Plan on August 30, 2012 for aquatic species, including foothill yellow-legged frog and western pond turtle, and note that other monitoring is included in resource-specific plans.
36	Large woody debris management plan	Forest Service	\$64,000	Yes, in coordination with BLM conditions 9 and 24. Limit scope of stream reaches to be surveyed based on dam and watershed characteristics for generating and passing LWD to downstream reaches.
37	Recreation Survey, Monitoring, and Future Development Triggers	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
38	Licensee Contact	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
39	Review of Recreation Developments	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
40	Annual Recreation Coordination Meeting	Forest Service	Included in the cost for the Recreation Plan (Forest Service condition 41)	Yes
41	Recreation Plan	Forest Service	\$2,965,000	Yes, we recommend implementation of NID's revised Recreation Plan filed on August 30, 2012, as modified by staff.
42	Visual Resource Management Plan	Forest Service	\$5,000	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
43	Finalize HPMP within 1 year after license issuance. During ground disturbance, notice Forest Service of any discovery involving cultural resources or paleontological resources and not resume work on ground disturbing activities until receipt of written notice from the Forest Service.	Forest Service	\$116,000	Yes, but recommend NID implement the final HPMP filed on October 5, 2012 with modifications involving eight cultural resource sites that need to be evaluated and protected/mitigated from project-related effects. Also adopt NID's alternative 4(e) condition involving treatment of inadvertent discoveries that is already in the HPMP but does not include paleontological resources or receipt of written notice to proceed.
44	Transportation Management Plan	Forest Service	\$142,000	Yes
45	Fire Management and Response Plan	Forest Service	\$4,000	Yes
1	Employee training	BLM	\$20,000	Yes
2	Coordinated operations plan	BLM	\$4,000	Yes
3	Water year types	BLM	\$54,000	Yes
4	Minimum streamflows for 2 project-affected stream reaches	BLM	\$54,000	Yes
5	Canal outages	BLM	\$54,000	Yes
6	Chicago Park powerhouse motoring	BLM	\$54,000	Yes
7	Spill cessations measures	BLM	\$54,000	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
8	Rollins reservoir elevation control	BLM	\$54,000	Yes
9	Rollins dam large woody debris material management	BLM	\$64,000	Yes
10	Steephollow Creek Foothill Yellow-legged Frog monitoring	BLM	\$17,000	Yes
11	Canal outages fish rescue plan for 1 project canals	BLM	\$52,000	Yes
12	Ecological group	BLM	\$50,000	Yes, but the terms of this recommendation would be fulfilled through the annual consultation process.
13	Gaging plan	BLM	\$95,000	Yes
15	Aquatic invasive species management	BLM	\$17,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan filed on August 30, 2012 that includes measures that address aquatic invasive species.
16	Terrestrial Protection Measures: Vegetation and Non-Native Invasive Plant Management Plan	BLM	\$91,000	Yes, we recommend implementation of NID's Non-Native Invasive Plant Management Plan filed on August 30, 2012.
17	Monitor Animal Losses in Project Canals	BLM	\$10,000	Yes
18	Replacement of Wildlife Escape and Wildlife Crossing Facilities	BLM	\$1,000	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
19	Bald Eagle Management Plan	BLM	\$5,000	Yes, we recommend implementation of NID's Bald Eagle Management Plan filed on August 30, 2012.
20	Special Status Species (same a condition 52)	BLM	\$0	No, a biological evaluation would be considered during any project construction activity. No additional condition is necessary.
21	Annual Review of Special Status Species	BLM	\$16,000	Yes
22	Bat Management	BLM	\$3,000	Yes
23	Monitoring program	BLM	\$80,000	Yes, we recommend implementation of the PG&E's Aquatic Monitoring Plan filed on August 30, 2012 for aquatic species, including foothill yellow-legged frog and western pond turtle, and note that other monitoring is included in resource-specific plans.
24	Dutch Flat afterbay woody debris management plan	BLM	\$64,000	Yes
25	Slope Assessment and Facility Release Plan	BLM	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
26	Recreation Plan	BLM	Included in the cost for the Recreation Plan	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
27	Licensee Contact	BLM	Included in the cost for the Recreation Plan	Yes
28	Annual Recreation Coordination Meeting	BLM	Included in the cost for the Recreation Plan	Yes
29	Review of Recreation Developments	BLM	Included in the cost for the Recreation Plan	Yes
30	Recreation Survey and Monitoring	BLM	Included in the cost for the Recreation Plan	Yes
31	General measures for All Recreation Sites	BLM	Included in the cost for the Recreation Plan	Yes, with site-specific staff modifications.
32	Vegetation Management in Recreation Facilities	BLM	Included in the cost for the Recreation Plan	Yes
33	Dutch Flat Afterbay Day-use Recreation Site	BLM	Included in the cost for the Recreation Plan	Yes
34	Chicago Park Power House and Connecting Facilities and Roads	BLM	\$50,000	Yes, with site-specific staff modifications.
35	Recreation Operation, Maintenance, and Administration Agreement	BLM	\$30,000	Yes
36	Recreation Plan Revision	BLM	Included in the cost for the Recreation Plan	Yes
37	Recreation Costs of Managing Facilities	BLM	Included in the cost for the Recreation Plan	Yes

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
38	Finalize HPMP within 1 year after license issuance. During ground disturbance, notice BLM of any discovery involving cultural resources or paleontological resources and not resume work on ground disturbing activities until receipt of written notice from the BLM.	BLM	\$116,000	Yes, but recommend NID implement the final HPMP filed on October 5, 2012 with modifications involving eight cultural resource sites that need to be evaluated and protected/mitigated from project-related effects. Also adopt NID's alternative 4(e) condition involving treatment of inadvertent discoveries that is already in the HPMP but does not include paleontological resources or receipt of written notice to proceed.
39	Transportation Management Plan	BLM	\$142,000	Yes
40	Fire Management and Response Plan	BLM	\$4,000	Yes
41	Erosion and Sediment Control and Management	BLM	\$400,000	Yes, we recommend implementation of NID's Erosion Control and Slope Maintenance Plan filed on August 30, 2012.
42	Consultation	BLM	\$15,000	Yes
52	Protection of Bureau of Land Management Special Status Species (same a condition 20)	BLM	\$0	No, a biological evaluation would be considered during any project construction activity. No additional condition is necessary.

Table 5-6. Forest Service and BLM 4(e) conditions for the Yuba-Bear Project. (Source: staff)

Condition No.	Condition	Agency	Annualized Cost	Adopted?
56	Pesticide-Use Restrictions on Bureau of Land Management Lands	BLM	\$0	Yes

5.3 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by a project. We reviewed the following 21 comprehensive plans that are applicable to the Drum-Spaulding and Yuba-Bear Projects, located in California. No inconsistencies were found.

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Appendix A

Aquatic Resources Tables

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Appendix A-1

Aquatic Resources Tables: Affected Environment

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Table 3-5. Physical characteristics of reservoirs, forebays, and afterbays, by sub-basin. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Reservoir, Forebay, Afterbay	Project	Development	Elevation (feet msl)		Storage Capacity (acre-feet)	
			Normal Maximum	Normal Minimum	Gross	Usable
Middle Yuba River Sub-Basin						
Jackson Meadows Reservoir	Yuba-Bear	Bowman	6,036	5,980	67,435	64,641
Milton Diversion Impoundment	Yuba-Bear	Bowman	5,690	5,686	275	275
Canyon Creek Sub-Basin						
Jackson Lake	Yuba-Bear	Bowman	6,592.7	6,570	1,334	975
French Lake	Yuba-Bear	Bowman	6,660.3	6,608	13,940	13,940
Faucherie Lake	Yuba-Bear	Bowman	6,123	6,090	3,980	3,740
Sawmill Lake	Yuba-Bear	Bowman	5,860	5,805	3,030	3,030
Bowman Lake	Yuba-Bear	Bowman	5,562	5,400	68,363	68,363
Upper Rock Lake	Drum-Spaulding	Spaulding No. 3	6,741.5	6,700.3	275	207
Lower Rock Lake	Drum-Spaulding	Spaulding No. 3	6,625.8	6,617.4	Unknown	48
Culbertson Lake	Drum-Spaulding	Spaulding No. 3	6,436.4	6,421.7	3,150	953
Upper Lindsey Lake	Drum-Spaulding	Spaulding No. 3	6,482.6	6,477.5	Unknown	18
Middle Lindsey Lake	Drum-Spaulding	Spaulding No. 3	6,435.7	6,429.7	Unknown	110
Lower Lindsey Lake	Drum-Spaulding	Spaulding No. 3	6,235.6	6,224.7	Unknown	278
Fall Creek Sub-Basin						
Feeley Lake	Drum-Spaulding	Spaulding No. 3	6,723.6	6,706.8	Unknown	739
Carr Lake	Drum-Spaulding	Spaulding No. 3	6,663.7	6,651.9	Unknown	150

Table 3-5. Physical characteristics of reservoirs, forebays, and afterbays, by sub-basin. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Reservoir, Forebay, Afterbay	Project	Development	Elevation (feet msl)		Storage Capacity (acre-feet)	
			Normal Maximum	Normal Minimum	Gross	Usable
Rucker Creek Sub-Basin						
Blue Lake	Drum-Spaulding	Spaulding No. 3	5,931.6	5,910.8	4,042	1,158
Rucker Lake	Drum-Spaulding	Spaulding No. 3	5,464.2	5,447.2	Unknown	648
South Yuba River Sub-Basin						
White Rock Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	7,820	7,810.5	Unknown	570
Meadow Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	7,281.8	7,252.7	4935	4,841
Lake Sterling	Drum-Spaulding	Spaulding No. 1 And No. 2	6,987.9	6,966	Unknown	1,764
Fordyce Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	6,405.1	6,290.5	49525	49,426
Kidd Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	6,627.6	6,600.3	Unknown	1,505
Upper Peak Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	6,607.4	6,572.4	Unknown	1,736
Lower Peak Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	6,581.9	6,560.4	Unknown	484
Fuller Lake	Drum-Spaulding	Spaulding No. 1 And No. 2	5,341.8	5,320.4	Unknown	1,109
Lake Spaulding	Drum-Spaulding	Spaulding No. 1 And No. 2	5,014.6	4,832.3	75912	75,912

Table 3-5. Physical characteristics of reservoirs, forebays, and afterbays, by sub-basin. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Reservoir, Forebay, Afterbay	Project	Development	Elevation (feet msl)		Storage Capacity (acre-feet)	
			Normal Maximum	Normal Minimum	Gross	Usable
Deer Creek Sub-Basin						
Deer Creek Forebay	Drum-Spaulding	Deer Creek	4,473	4,469	15.8	10.7
North Fork American River Sub-Basin						
Kelly Lake	Drum-Spaulding	Drum No. 1 And No. 2	5,908.8	5,890.2	Unknown	352
Lake Valley Reservoir	Drum-Spaulding	Drum No. 1 And No. 2	5,784.9	5,728.4	7,902	7,902
Bear River Sub-Basin						
Drum Forebay	Drum-Spaulding	Drum No. 1 And No. 2	4,756	4,738	621	436
Drum Afterbay	Drum-Spaulding	Dutch Flat No. 1	3,383.3	3,342	154.5	150.4
Dutch Flat No. 2 Forebay	Yuba-Bear	Dutch Flat No.2	3,330	3,323	177.9	159.8
Alta Forebay	Drum-Spaulding	Alta	4,240	4,236	37.5	19.4
Dutch Flat Afterbay	Yuba-Bear	Chicago Park	2,741	2,729	1,359.2	1,359.2
Chicago Park Forebay	Yuba-Bear	Chicago Park	2,716	2,710	103	103
Rollins Reservoir	Yuba-Bear	Rollins	2,171	2,030	58,682	54,453
Mormon Ravine Sub-Basin						
Halsey Forebay	Drum-Spaulding	Halsey	1,816.7	1,803.7	244	238
Halsey Afterbay	Drum-Spaulding	Wise And Wise No. 2	1,494	1,480.8	86	76
Rock Creek Reservoir	Drum-Spaulding	Wise And Wise No. 2	1,439.6	1,423.1	485	482
Auburn Ravine Sub-Basin						
Wise Forebay	Drum-Spaulding	Wise And Wise No. 2	1,418	1,407	32	32

Table 3-6. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Upper Rock Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	7.0 ^(a)	60.0 ^(a)	117.0 ^(a)
November	15.6 ^(a)	45.0 ^(a)	89.8 ^(a)
December	20.0 ^(a)	108.6 ^(a)	174.3 ^(a)
January	19.0 ^(a)	154.8 ^(a)	199.0 ^(a)
February	19.0 ^(a)	190.0 ^(a)	199.8 ^(a)
March	87.3 ^(a)	201.0 ^(a)	207.0 ^(a)
April	159.9 ^(a)	204.0 ^(a)	207.0 ^(a)
May	198.0 ^(a)	207.0 ^(a)	207.0 ^(a)
June	191.0 ^(a)	205.0 ^(a)	207.0 ^(a)
July	162.0 ^(a)	188.0 ^(a)	203.0 ^(a)
August	123.0 ^(a)	151.0 ^(a)	175.0 ^(a)
September	54.0 ^(a)	111.0 ^(a)	145.9 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-7. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lower Rock Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	12.7 ^(a)	31.0 ^(a)	46.1 ^(a)
November	7.0 ^(a)	28.0 ^(a)	48.0 ^(a)
December	11.5 ^(a)	44.6 ^(a)	48.0 ^(a)
January	20.2 ^(a)	48.0 ^(a)	48.0 ^(a)
February	28.4 ^(a)	48.0 ^(a)	48.0 ^(a)
March	36.7 ^(a)	48.0 ^(a)	48.0 ^(a)
April	45.1 ^(a)	48.0 ^(a)	48.0 ^(a)
May	47.7 ^(a)	48.0 ^(a)	48.0 ^(a)
June	46.4 ^(a)	48.0 ^(a)	48.0 ^(a)
July	42.9 ^(a)	47.6 ^(a)	48.0 ^(a)
August	37.0 ^(a)	45.0 ^(a)	48.0 ^(a)
September	31.0 ^(a)	40.5 ^(a)	48.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-8. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Culbertson Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	6.0 ^(a)	267.0 ^(a)	529.0 ^(a)
November	30.0 ^(a)	242.0 ^(a)	459.8 ^(a)
December	101.2 ^(a)	265.0 ^(a)	584.3 ^(a)
January	63.2 ^(a)	391.0 ^(a)	431.0 ^(a)
February	149.5 ^(a)	337.5 ^(a)	438.0 ^(a)
March	218.5 ^(a)	368.5 ^(a)	823.0 ^(a)
April	323.0 ^(a)	505.0 ^(a)	953.0 ^(a)
May	399.0 ^(a)	598.0 ^(a)	953.0 ^(a)
June	340.8 ^(a)	781.0 ^(a)	953.6 ^(a)
July	292.0 ^(a)	813.0 ^(a)	920.0 ^(a)
August	195.2 ^(a)	669.0 ^(a)	812.4 ^(a)
September	73.6 ^(a)	418.0 ^(a)	678.9 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-9. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Middle Lindsey Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	12.6 ^(a)	23.0 ^(a)	49.3 ^(a)
November	12.0 ^(a)	23.1 ^(a)	53.4 ^(a)
December	14.0 ^(a)	38.1 ^(a)	80.1 ^(a)
January	14.0 ^(a)	28.3 ^(a)	96.8 ^(a)
February	14.0 ^(a)	89.0 ^(a)	98.0 ^(a)
March	82.2 ^(a)	103.6 ^(a)	110.0 ^(a)
April	107.3 ^(a)	110.0 ^(a)	110.0 ^(a)
May	109.2 ^(a)	110.0 ^(a)	110.0 ^(a)
June	100.4 ^(a)	110.0 ^(a)	112.0 ^(a)
July	77.0 ^(a)	95.2 ^(a)	110.0 ^(a)
August	47.0 ^(a)	71.0 ^(a)	98.0 ^(a)
September	22.0 ^(a)	42.0 ^(a)	71.8 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-10. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lower Lindsey Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	72.0 ^(a)	152.7 ^(a)	247.1 ^(a)
November	77.0 ^(a)	137.0 ^(a)	241.9 ^(a)
December	63.5 ^(a)	177.0 ^(a)	240.2 ^(a)
January	35.8 ^(a)	174.2 ^(a)	259.5 ^(a)
February	41.9 ^(a)	260.0 ^(a)	270.5 ^(a)
March	125.8 ^(a)	272.8 ^(a)	289.2 ^(a)
April	238.6 ^(a)	275.0 ^(a)	296.8 ^(a)
May	275.0 ^(a)	278.0 ^(a)	293.0 ^(a)
June	257.0 ^(a)	275.0 ^(a)	281.3 ^(a)
July	222.0 ^(a)	268.1 ^(a)	275.4 ^(a)
August	177.0 ^(a)	245.5 ^(a)	273.0 ^(a)
September	117.3 ^(a)	206.0 ^(a)	263.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-11. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Carr Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	39.3 ^(a)	88.2 ^(a)	134.3 ^(a)
November	18.1 ^(a)	66.3 ^(a)	144.0 ^(a)
December	6.0 ^(a)	69.0 ^(a)	110.4 ^(a)
January	20.7 ^(a)	49.2 ^(a)	64.2 ^(a)
February	19.2 ^(a)	48.6 ^(a)	75.0 ^(a)
March	23.1 ^(a)	86.1 ^(a)	127.2 ^(a)
April	43.4 ^(a)	137.2 ^(a)	150.0 ^(a)
May	77.4 ^(a)	143.9 ^(a)	150.0 ^(a)
June	102.7 ^(a)	150.0 ^(a)	152.0 ^(a)
July	98.6 ^(a)	142.0 ^(a)	150.0 ^(a)
August	82.9 ^(a)	131.0 ^(a)	148.5 ^(a)
September	62.8 ^(a)	112.2 ^(a)	143.9 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-12. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Blue Lake (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	181.3 ^(a)	619.5 ^(a)
November	0.0 ^(a)	186.4 ^(a)	526.9 ^(a)
December	12.9 ^(a)	148.0 ^(a)	410.7 ^(a)
January	0.0 ^(a)	44.8 ^(a)	1,178.6 ^(a)
February	47.7 ^(a)	175.0 ^(a)	911.9 ^(a)
March	73.5 ^(a)	238.3 ^(a)	601.3 ^(a)
April	85.6 ^(a)	343.4 ^(a)	641.7 ^(a)
May	219.8 ^(a)	470.3 ^(a)	902.0 ^(a)
June	173.7 ^(a)	567.2 ^(a)	1,039.8 ^(a)
July	105.9 ^(a)	529.9 ^(a)	934.4 ^(a)
August	23.4 ^(a)	423.9 ^(a)	832.5 ^(a)
September	0.0 ^(a)	298.0 ^(a)	689.3 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-13. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Meadow Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	1,117.1 ^(a)	3,309.3 ^(a)
November	0.0 ^(a)	59.6 ^(a)	2,090.5 ^(a)
December	0.0 ^(a)	55.9 ^(a)	1,766.2 ^(a)
January	0.0 ^(a)	223.7 ^(a)	2,440.0 ^(a)
February	0.0 ^(a)	652.8 ^(a)	3,092.5 ^(a)
March	0.0 ^(a)	1,287.2 ^(a)	3,748.6 ^(a)
April	109.9 ^(a)	2,130.8 ^(a)	4,329.6 ^(a)
May	832.0 ^(a)	2,985.4 ^(a)	4,841.0 ^(a)
June	2,460.7 ^(a)	4,162.2 ^(a)	4,841.0 ^(a)
July	2,520.7 ^(a)	4,547.1 ^(a)	4,841.0 ^(a)
August	2,406.2 ^(a)	4,114.1 ^(a)	4,773.7 ^(a)
September	711.3 ^(a)	2,645.2 ^(a)	4,471.9 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-14. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in White Rock Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	88.3 ^(a)	263.5 ^(a)
November	0.0 ^(a)	24.1 ^(a)	135.1 ^(a)
December	0.0 ^(a)	31.9 ^(a)	180.6 ^(a)
January	0.0 ^(a)	52.6 ^(a)	355.9 ^(a)
February	0.0 ^(a)	125.6 ^(a)	510.2 ^(a)
March	0.0 ^(a)	224.5 ^(a)	570.0 ^(a)
April	0.0 ^(a)	265.5 ^(a)	570.0 ^(a)
May	120.0 ^(a)	513.9 ^(a)	570.0 ^(a)
June	420.6 ^(a)	570.0 ^(a)	570.0 ^(a)
July	230.6 ^(a)	552.0 ^(a)	570.0 ^(a)
August	42.3 ^(a)	462.0 ^(a)	566.6 ^(a)
September	0.0 ^(a)	256.0 ^(a)	442.5 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-15. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lake Sterling (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	363.0 ^(a)	1,066.5 ^(a)
November	0.0 ^(a)	22.8 ^(a)	542.6 ^(a)
December	0.0 ^(a)	76.4 ^(a)	790.2 ^(a)
January	6.7 ^(a)	234.3 ^(a)	1,298.7 ^(a)
February	64.0 ^(a)	404.8 ^(a)	1,360.0 ^(a)
March	127.8 ^(a)	629.4 ^(a)	1,672.9 ^(a)
April	470.6 ^(a)	969.9 ^(a)	1,642.0 ^(a)
May	992.2 ^(a)	1,348.8 ^(a)	1,753.6 ^(a)
June	1,374.4 ^(a)	1,620.0 ^(a)	1,757.3 ^(a)
July	1,350.6 ^(a)	1,652.9 ^(a)	1,751.1 ^(a)
August	1,242.3 ^(a)	1,517.7 ^(a)	1,676.5 ^(a)
September	611.0 ^(a)	1,220.1 ^(a)	1,541.6 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-16. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Fordyce Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	3,469.4 ^(a)	9,751.7 ^(a)	24,301.2 ^(a)
November	3,443.5 ^(a)	8,270.8 ^(a)	16,779.6 ^(a)
December	4,406.7 ^(a)	7,695.2 ^(a)	19,028.0 ^(a)
January	5,165.8 ^(a)	8,778.1 ^(a)	34,800.4 ^(a)
February	5,573.9 ^(a)	9,426.8 ^(a)	33,765.1 ^(a)
March	6,193.0 ^(a)	10,977.3 ^(a)	35,256.1 ^(a)
April	7,981.3 ^(a)	17,449.1 ^(a)	36,762.3 ^(a)
May	18,596.2 ^(a)	34,418.3 ^(a)	44,113.8 ^(a)
June	31,922.4 ^(a)	43,119.4 ^(a)	49,037.1 ^(a)
July	17,265.7 ^(a)	36,536.0 ^(a)	46,585.5 ^(a)
August	6,509.2 ^(a)	24,984.9 ^(a)	41,292.5 ^(a)
September	3,892.7 ^(a)	15,705.6 ^(a)	31,634.9 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-17. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Kidd Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	71.0 ^(a)	245.9 ^(a)	618.9 ^(a)
November	32.0 ^(a)	117.1 ^(a)	255.7 ^(a)
December	69.7 ^(a)	169.4 ^(a)	315.8 ^(a)
January	92.8 ^(a)	241.9 ^(a)	526.4 ^(a)
February	146.7 ^(a)	377.3 ^(a)	812.5 ^(a)
March	223.5 ^(a)	583.2 ^(a)	977.9 ^(a)
April	423.0 ^(a)	874.6 ^(a)	1,245.8 ^(a)
May	692.2 ^(a)	1,210.0 ^(a)	1,510.0 ^(a)
June	694.0 ^(a)	1,359.0 ^(a)	1,543.0 ^(a)
July	652.0	1,230.0	1,482.1
August	593.0	907.0	1,376.8
September	209.8 ^(a)	589.0 ^(a)	1,247.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-18. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Upper Peak Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	276.0 ^(a)	917.7 ^(a)
November	0.0 ^(a)	44.0 ^(a)	262.8 ^(a)
December	0.0 ^(a)	76.7 ^(a)	314.5 ^(a)
January	12.8 ^(a)	203.0 ^(a)	847.9 ^(a)
February	87.0 ^(a)	381.2 ^(a)	1,160.0 ^(a)
March	101.1 ^(a)	598.1 ^(a)	1,268.0 ^(a)
April	343.9 ^(a)	923.6 ^(a)	1,619.2 ^(a)
May	830.7 ^(a)	1,374.2 ^(a)	1,736.0 ^(a)
June	1,023.0 ^(a)	1,662.0 ^(a)	1,736.0 ^(a)
July	866.0 ^(a)	1,649.0 ^(a)	1,726.9 ^(a)
August	525.7 ^(a)	1,508.6 ^(a)	1,664.7 ^(a)
September	206.7 ^(a)	944.5 ^(a)	1,571.7 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-19. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lower Peak Lake (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	0.0 ^(a)	241.0 ^(a)	357.4 ^(a)
November	0.0 ^(a)	63.0 ^(a)	232.0 ^(a)
December	0.0 ^(a)	85.0 ^(a)	161.8 ^(a)
January	95.0 ^(a)	125.0 ^(a)	198.7 ^(a)
February	108.0 ^(a)	182.0 ^(a)	218.6 ^(a)
March	137.3 ^(a)	196.0 ^(a)	347.9 ^(a)
April	225.4 ^(a)	384.0 ^(a)	487.0 ^(a)
May	436.0 ^(a)	490.0 ^(a)	497.0 ^(a)
June	424.0 ^(a)	484.0 ^(a)	494.0 ^(a)
July	364.0 ^(a)	451.0 ^(a)	481.0 ^(a)
August	229.2 ^(a)	415.0 ^(a)	475.0 ^(a)
September	184.0 ^(a)	341.0 ^(a)	414.5 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-20. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lake Spaulding (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	20,100.0 ^(a)	40,322.0 ^(a)	52,919.8 ^(a)
November	21,686.6 ^(a)	34,987.0 ^(a)	49,331.7 ^(a)
December	18,192.6 ^(a)	28,572.5 ^(a)	47,983.1 ^(a)
January	15,679.8 ^(a)	24,493.0 ^(a)	53,753.9 ^(a)
February	10,246.5 ^(a)	20,643.5 ^(a)	55,757.1 ^(a)
March	10,172.7 ^(a)	25,096.0 ^(a)	58,605.0 ^(a)
April	18,042.3 ^(a)	45,301.0 ^(a)	64,894.3 ^(a)
May	42,067.6 ^(a)	66,633.5 ^(a)	73,496.6 ^(a)
June	58,931.7 ^(a)	70,101.0 ^(a)	74,529.0 ^(a)
July	45,900.0 ^(a)	64,462.0 ^(a)	73,425.2 ^(a)
August	29,911.6 ^(a)	51,459.5 ^(a)	63,518.1 ^(a)
September	18,990.0 ^(a)	40,571.0 ^(a)	56,685.5 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-21. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Lake Valley reservoir (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	2,887.2 ^(a)	4,287.4 ^(a)	5,808.6 ^(a)
November	2,610.6 ^(a)	3,490.5 ^(a)	5,022.4 ^(a)
December	2,085.9 ^(a)	3,248.3 ^(a)	5,793.8 ^(a)
January	1,637.4 ^(a)	2,997.4 ^(a)	6,785.2 ^(a)
February	1,133.9 ^(a)	3,358.0 ^(a)	6,841.9 ^(a)
March	1,181.3 ^(a)	4,267.9 ^(a)	6,923.4 ^(a)
April	2,322.5 ^(a)	5,354.8 ^(a)	7,362.7 ^(a)
May	4,436.7 ^(a)	7,155.9 ^(a)	7,841.1 ^(a)
June	4,964.4 ^(a)	7,654.7 ^(a)	7,867.6 ^(a)
July	4,584.4 ^(a)	7,256.4 ^(a)	7,753.5 ^(a)
August	3,979.6 ^(a)	6,075.1 ^(a)	7,297.0 ^(a)
September	3,429.1 ^(a)	5,078.3 ^(a)	6,688.2 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-22. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Kelly Lake (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	30.0 ^(a)	177.8 ^(a)	259.5 ^(a)
November	19.0 ^(a)	83.0 ^(a)	249.0 ^(a)
December	34.0 ^(a)	106.7 ^(a)	306.6 ^(a)
January	38.7 ^(a)	145.9 ^(a)	313.3 ^(a)
February	43.0 ^(a)	164.4 ^(a)	315.0 ^(a)
March	91.4 ^(a)	285.0 ^(a)	318.0 ^(a)
April	259.4 ^(a)	315.9 ^(a)	335.6 ^(a)
May	311.0 ^(a)	334.0 ^(a)	339.8 ^(a)
June	313.0 ^(a)	331.1 ^(a)	338.0 ^(a)
July	294.8 ^(a)	311.0 ^(a)	328.1 ^(a)
August	270.4 ^(a)	287.0 ^(a)	306.0 ^(a)
September	67.2 ^(a)	262.7 ^(a)	286.1 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-23. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Drum forebay (Drum-Spaulding Project, Dutch Flat No. 1 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	74.3 ^(a)	223.5 ^(a)	297.4 ^(a)
November	95.6 ^(a)	225.0 ^(a)	297.2 ^(a)
December	108.6 ^(a)	240.0 ^(a)	302.4 ^(a)
January	88.0 ^(a)	228.5 ^(a)	297.5 ^(a)
February	95.0 ^(a)	240.0 ^(a)	309.0 ^(a)
March	99.0 ^(a)	253.0 ^(a)	317.0 ^(a)
April	100.0 ^(a)	242.0 ^(a)	312.2 ^(a)
May	94.0 ^(a)	243.0 ^(a)	311.0 ^(a)
June	80.0 ^(a)	241.5 ^(a)	296.0 ^(a)
July	89.0 ^(a)	233.0 ^(a)	298.9 ^(a)
August	100.0 ^(a)	247.0 ^(a)	311.6 ^(a)
September	86.0 ^(a)	232.0 ^(a)	310.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-24. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Halsey forebay (Drum-Spaulding Project, Halsey Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	134.0 ^(a)	192.0 ^(a)	239.7 ^(a)
November	77.0 ^(a)	186.0 ^(a)	233.0 ^(a)
December	149.8 ^(a)	194.0 ^(a)	223.0 ^(a)
January	149.0 ^(a)	191.0 ^(a)	226.0 ^(a)
February	149.0 ^(a)	190.0 ^(a)	221.0 ^(a)
March	149.0 ^(a)	192.0 ^(a)	231.0 ^(a)
April	159.0 ^(a)	200.0 ^(a)	229.0 ^(a)
May	167.0 ^(a)	205.0 ^(a)	230.0 ^(a)
June	168.0 ^(a)	212.1 ^(a)	231.0 ^(a)
July	171.9 ^(a)	213.6 ^(a)	234.1 ^(a)
August	172.0 ^(a)	211.0 ^(a)	235.0 ^(a)
September	174.0 ^(a)	216.4 ^(a)	233.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-25. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Halsey afterbay (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	4.0 ^(a)	49.0 ^(a)	65.0 ^(a)
November	2.0 ^(a)	49.0 ^(a)	64.0 ^(a)
December	3.0 ^(a)	50.8 ^(a)	64.0 ^(a)
January	4.0 ^(a)	49.0 ^(a)	62.7 ^(a)
February	3.0 ^(a)	49.8 ^(a)	63.1 ^(a)
March	3.0 ^(a)	52.0 ^(a)	62.3 ^(a)
April	2.0 ^(a)	53.6 ^(a)	63.8 ^(a)
May	4.0 ^(a)	57.1 ^(a)	64.8 ^(a)
June	4.0 ^(a)	57.0 ^(a)	64.0 ^(a)
July	4.0 ^(a)	61.8 ^(a)	65.0 ^(a)
August	4.0 ^(a)	61.0 ^(a)	67.8 ^(a)
September	4.0 ^(a)	55.0 ^(a)	67.5 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-26. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Rock Creek reservoir (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	123.0 ^(a)	363.0 ^(a)	515.0 ^(a)
November	89.0 ^(a)	275.0 ^(a)	440.0 ^(a)
December	114.8 ^(a)	260.0 ^(a)	526.0 ^(a)
January	118.5 ^(a)	267.0 ^(a)	517.0 ^(a)
February	122.0 ^(a)	252.7 ^(a)	504.0 ^(a)
March	111.0 ^(a)	259.2 ^(a)	520.0 ^(a)
April	132.3 ^(a)	294.0 ^(a)	504.0 ^(a)
May	108.0 ^(a)	310.7 ^(a)	471.0 ^(a)
June	106.5 ^(a)	323.0 ^(a)	439.5 ^(a)
July	108.0 ^(a)	341.9 ^(a)	445.4 ^(a)
August	114.7 ^(a)	354.6 ^(a)	465.0 ^(a)
September	109.4 ^(a)	349.4 ^(a)	471.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-27. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Wise forebay (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	12.0 ^(a)	23.0 ^(a)	25.0 ^(a)
November	16.0 ^(a)	23.0 ^(a)	25.0 ^(a)
December	21.0 ^(a)	24.0 ^(a)	25.0 ^(a)
January	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
February	21.0 ^(a)	24.0 ^(a)	25.0 ^(a)
March	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
April	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
May	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
June	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
July	23.0 ^(a)	24.0 ^(a)	26.0 ^(a)
August	22.0 ^(a)	24.0 ^(a)	25.0 ^(a)
September	22.0 ^(a)	24.0 ^(a)	26.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-28. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Texas Creek below Upper Rock Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0	0.0	0.1	No data	No data	No data
November	0.0	0.0	0.5	No data	No data	No data
December	0.0	0.2	0.8	No data	No data	No data
January	0.1	0.3	1.0	No data	No data	No data
February	0.1	0.4	1.2	No data	No data	No data
March	0.4	0.8	2.4	No data	No data	No data
April	0.7	1.7	3.5	No data	No data	No data
May	0.6	2.3	4.7	No data	No data	No data
June	0.0	0.5	3.2	No data	No data	No data
July	0.0	0.0	0.6	No data	No data	No data
August	0.0	0.0	0.0	No data	No data	No data
September	0.0	0.0	0.1	No data	No data	No data

Table 3-29. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Texas Creek below Lower Rock Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.3 ^(a)	1.0 ^(a)	1.2 ^(a)	0.0	0.0	0.2
November	0.1 ^(a)	0.3 ^(a)	1.0 ^(a)	0.0	0.1	0.8
December	0.3 ^(a)	0.8 ^(a)	1.0 ^(a)	0.0	0.3	1.4
January	No data	No data	No data	0.1	0.4	1.7
February	No data	No data	No data	0.2	0.7	2.0
March	No data	No data	No data	0.6	1.2	3.9
April	No data	No data	No data	1.2	2.8	5.8
May	0.5 ^(a)	0.6 ^(a)	0.6 ^(a)	1.0	3.8	7.6
June	0.2 ^(a)	0.3 ^(a)	0.7 ^(a)	0.1	0.8	5.1
July	0.2 ^(a)	0.3 ^(a)	0.5 ^(a)	0.0	0.0	0.9
August	0.2 ^(a)	0.3 ^(a)	0.5 ^(a)	0.0	0.0	0.1
September	0.3 ^(a)	0.6 ^(a)	1.1 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-30. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in an unnamed tributary below Culberston Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	0.9 ^(a)	1.2 ^(a)	0.0	0.0	0.3
November	0.0 ^(a)	0.7 ^(a)	1.1 ^(a)	0.0	0.1	1.4
December	0.4 ^(a)	0.7 ^(a)	0.9 ^(a)	0.1	0.5	2.3
January	No data	No data	No data	0.2	0.7	2.8
February	No data	No data	No data	0.3	1.1	3.3
March	No data	No data	No data	1.0	2.1	6.5
April	0.7 ^(a)	0.8 ^(a)	0.8 ^(a)	2.0	4.6	9.6
May	0.7 ^(a)	0.9 ^(a)	1.2 ^(a)	1.7	6.4	13.0
June	0.7 ^(a)	0.8 ^(a)	1.2 ^(a)	0.1	1.5	8.9
July	0.7 ^(a)	0.9 ^(a)	1.1 ^(a)	0.0	0.1	1.6
August	0.7 ^(a)	0.8 ^(a)	1.0 ^(a)	0.0	0.0	0.1
September	0.5 ^(a)	0.8 ^(a)	1.1 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-31. Exceedance frequency analysis (10, 50, and 90 percent) for regulated and estimated unregulated flow (cfs) in Lindsey Creek below Upper Lindsey Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
Month	Unregulated	Unregulated	Unregulated
October	0.0	0.0	0.1
November	0.0	0.0	0.4
December	0.0	0.2	0.7
January	0.1	0.2	0.9
February	0.1	0.4	1.1
March	0.3	0.7	2.1
April	0.6	1.6	3.2
May	0.6	2.4	4.7
June	0.0	0.6	3.6
July	0.0	0.0	0.8
August	0.0	0.0	0.0
September	0.0	0.0	0.0

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-32. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Lindsey Creek below Middle Lindsey Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	0.3 ^(a)	0.6 ^(a)	0.0	0.0	0.2
November	0.0 ^(a)	0.0 ^(a)	0.4 ^(a)	0.0	0.1	1.1
December	0.0 ^(a)	0.0 ^(a)	0.2 ^(a)	0.1	0.4	1.8
January	0.1 ^(a)	0.4 ^(a)	0.8 ^(a)	0.1	0.6	2.2
February	0.0 ^(a)	0.3 ^(a)	0.5 ^(a)	0.2	0.9	2.6
March	0.2 ^(a)	0.5 ^(a)	0.5 ^(a)	0.8	1.6	5.0
April	0.1 ^(a)	0.3 ^(a)	0.4 ^(a)	1.5	3.7	7.6
May	0.2 ^(a)	0.4 ^(a)	0.7 ^(a)	1.4	5.2	10.5
June	0.3 ^(a)	0.3 ^(a)	0.6 ^(a)	0.1	1.2	7.5
July	0.3 ^(a)	0.3 ^(a)	0.5 ^(a)	0.0	0.1	1.4
August	0.3 ^(a)	0.3 ^(a)	0.4 ^(a)	0.0	0.0	0.1
September	0.0 ^(a)	0.3 ^(a)	0.5 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-33. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Lindsey Creek below Lower Lindsey Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.4 ^(a)	0.7 ^(a)	1.0 ^(a)	0.0	0.1	0.5
November	0.4 ^(a)	0.8 ^(a)	1.1 ^(a)	0.1	0.2	2.5
December	0.6 ^(a)	0.7 ^(a)	1.0 ^(a)	0.2	0.9	4.2
January	0.8 ^(a)	0.9 ^(a)	0.9 ^(a)	0.3	1.3	5.1
February	No data	No data	No data	0.5	2.1	6.1
March	No data	No data	No data	1.8	3.8	11.9
April	0.5 ^(a)	0.6 ^(a)	1.0 ^(a)	3.6	8.6	17.9
May	0.4 ^(a)	0.6 ^(a)	1.0 ^(a)	3.2	12.0	24.4
June	0.3 ^(a)	0.7 ^(a)	1.1 ^(a)	0.2	2.8	17.0
July	0.5 ^(a)	0.7 ^(a)	1.1 ^(a)	0.0	0.1	3.2
August	0.5 ^(a)	0.7 ^(a)	1.1 ^(a)	0.0	0.1	0.2
September	0.5 ^(a)	0.7 ^(a)	1.0 ^(a)	0.0	0.1	0.3

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-34. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Lake Creek below Feeley Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.4 ^(a)	0.8 ^(a)	2.2 ^(a)	0.0	0.0	0.2
November	0.5 ^(a)	0.7 ^(a)	1.2 ^(a)	0.0	0.1	1.1
December	0.2 ^(a)	0.6 ^(a)	0.8 ^(a)	0.1	0.4	1.9
January	0.6 ^(a)	0.6 ^(a)	0.7 ^(a)	0.1	0.6	2.4
February	0.0 ^(a)	0.6 ^(a)	0.6 ^(a)	0.2	1.0	2.8
March	0.3 ^(a)	0.6 ^(a)	0.7 ^(a)	0.8	1.8	5.5
April	0.5 ^(a)	0.6 ^(a)	0.8 ^(a)	1.7	4.0	8.3
May	0.3 ^(a)	0.8 ^(a)	1.5 ^(a)	1.5	5.7	11.4
June	0.5 ^(a)	0.7 ^(a)	1.0 ^(a)	0.1	1.4	8.2
July	0.5 ^(a)	0.6 ^(a)	0.9 ^(a)	0.0	0.1	1.6
August	0.5 ^(a)	0.6 ^(a)	0.9 ^(a)	0.0	0.0	0.1
September	0.5 ^(a)	0.7 ^(a)	2.3 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-35. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Lake Creek below Carr Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.7 ^(a)	2.0 ^(a)	4.3 ^(a)	0.0	0.0	0.3
November	0.5 ^(a)	2.2 ^(a)	5.0 ^(a)	0.0	0.1	1.4
December	0.4 ^(a)	0.8 ^(a)	2.1 ^(a)	0.1	0.5	2.3
January	0.3 ^(a)	0.4 ^(a)	1.0 ^(a)	0.2	0.7	2.8
February	0.3 ^(a)	0.4 ^(a)	0.7 ^(a)	0.3	1.1	3.4
March	0.3 ^(a)	0.8 ^(a)	0.9 ^(a)	1.0	2.1	6.6
April	0.5 ^(a)	1.0 ^(a)	414.6 ^(a)	2.0	4.8	9.9
May	0.6 ^(a)	1.2 ^(a)	293.8 ^(a)	1.8	6.8	13.6
June	0.5 ^(a)	1.0 ^(a)	4.9 ^(a)	0.1	1.6	9.6
July	0.5 ^(a)	0.8 ^(a)	2.0 ^(a)	0.0	0.1	1.8
August	0.4 ^(a)	0.7 ^(a)	1.0 ^(a)	0.0	0.0	0.1
September	0.5 ^(a)	1.1 ^(a)	3.2 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-36. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Rucker Creek below Blue Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.0	0.1
November	No data	No data	No data	0.0	0.1	0.9
December	No data	No data	No data	0.1	0.3	1.4
January	No data	No data	No data	0.1	0.5	1.8
February	No data	No data	No data	0.2	0.7	2.1
March	No data	No data	No data	0.6	1.2	3.6
April	No data	No data	No data	1.0	2.2	4.6
May	No data	No data	No data	0.8	2.9	6.1
June	No data	No data	No data	0.0	0.6	3.7
July	No data	No data	No data	0.0	0.0	0.6
August	No data	No data	No data	0.0	0.0	0.1
September	No data	No data	No data	0.0	0.0	0.1

Table 3-37. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Rucker Creek below Rucker Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.1	0.2	0.9
November	No data	No data	No data	0.2	0.6	6.2
December	No data	No data	No data	0.4	2.1	9.5
January	No data	No data	No data	0.8	3.2	12.2
February	No data	No data	No data	1.3	5.2	14.7
March	No data	No data	No data	4.0	8.6	25.1
April	No data	No data	No data	6.5	15.0	30.8
May	No data	No data	No data	5.1	19.8	41.1
June	No data	No data	No data	0.3	3.8	25.1
July	No data	No data	No data	0.0	0.1	4.3
August	No data	No data	No data	0.1	0.1	0.4
September	No data	No data	No data	0.1	0.1	0.5

Table 3-38. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in an unnamed tributary below Fuller Lake dam (Drum-Spaulding Project, Spaulding No. 3 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.3
November	No data	No data	No data	0.1	0.2	2.1
December	No data	No data	No data	0.1	0.7	3.2
January	No data	No data	No data	0.3	1.1	4.2
February	No data	No data	No data	0.4	1.8	5.2
March	No data	No data	No data	1.3	2.9	8.3
April	No data	No data	No data	2.0	4.6	9.5
May	No data	No data	No data	1.6	6.1	12.7
June	No data	No data	No data	0.1	1.1	7.5
July	No data	No data	No data	0.0	0.0	1.3
August	No data	No data	No data	0.0	0.0	0.1
September	No data	No data	No data	0.0	0.0	0.2

Table 3-39. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in an unnamed tributary below Meadow Lake dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.1	0.1	0.7
November	No data	No data	No data	0.1	0.3	2.5
December	No data	No data	No data	0.2	1.0	4.6
January	No data	No data	No data	0.4	1.4	5.5
February	No data	No data	No data	0.5	2.0	6.5
March	No data	No data	No data	1.8	4.1	12.5
April	No data	No data	No data	3.7	10.2	22.2
May	No data	No data	No data	6.0	19.8	40.2
June	No data	No data	No data	0.6	6.8	38.3
July	No data	No data	No data	0.1	0.4	9.9
August	No data	No data	No data	0.1	0.1	0.4
September	No data	No data	No data	0.1	0.1	0.4

Table 3-40. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in White Rock Creek below White Rock diversion dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.6
November	No data	No data	No data	0.1	0.2	1.7
December	No data	No data	No data	0.1	0.6	3.0
January	No data	No data	No data	0.2	0.9	3.8
February	No data	No data	No data	0.4	1.2	4.0
March	No data	No data	No data	1.1	2.6	8.2
April	No data	No data	No data	2.7	8.3	19.5
May	No data	No data	No data	6.1	19.3	39.0
June	No data	No data	No data	0.7	7.6	38.7
July	No data	No data	No data	0.1	0.5	10.6
August	No data	No data	No data	0.0	0.1	0.4
September	No data	No data	No data	0.0	0.1	0.3

Table 3-41. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Bloody Creek below Lake Sterling dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.5
November	No data	No data	No data	0.1	0.2	2.1
December	No data	No data	No data	0.1	0.8	3.7
January	No data	No data	No data	0.3	1.2	4.6
February	No data	No data	No data	0.4	1.7	5.4
March	No data	No data	No data	1.5	3.4	10.4
April	No data	No data	No data	3.0	8.2	17.6
May	No data	No data	No data	4.4	15.1	30.2
June	No data	No data	No data	0.4	4.9	27.3
July	No data	No data	No data	0.1	0.3	6.8
August	No data	No data	No data	0.0	0.1	0.3
September	No data	No data	No data	0.0	0.1	0.3

Table 3-42. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Fordyce Creek below Fordyce Lake dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.2	43.0	306.6	1.2	2.7	15.3
November	5.4	20.0	171.1	1.8	6.8	63.6
December	5.3	12.0	80.0	4.1	23.7	111.1
January	5.4	16.0	78.0	8.6	35.2	136.3
February	6.5	18.0	99.8	13.2	52.3	160.0
March	8.8	28.0	176.0	46.2	100.6	311.5
April	13.0	32.0	181.0	91.7	248.0	532.8
May	23.0	44.0	527.0	132.5	454.7	909.1
June	37.0	265.5	633.1	12.3	145.1	805.8
July	36.0	236.0	502.0	2.2	8.5	198.3
August	12.0	128.0	402.8	1.2	2.1	8.4
September	6.7	98.0	332.0	1.2	2.0	8.6

Table 3-43. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Unnamed tributary below Kidd Lake dam (Drum-Spaulling Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.0	0.3
November	No data	No data	No data	0.0	0.1	1.5
December	No data	No data	No data	0.1	0.5	2.5
January	No data	No data	No data	0.2	0.8	3.0
February	No data	No data	No data	0.3	1.2	3.5
March	No data	No data	No data	1.0	2.2	7.0
April	No data	No data	No data	2.1	5.0	10.3
May	No data	No data	No data	1.7	6.7	13.5
June	No data	No data	No data	0.1	1.4	9.0
July	No data	No data	No data	0.0	0.1	1.5
August	No data	No data	No data	0.0	0.0	0.1
September	No data	No data	No data	0.0	0.0	0.1

Table 3-44. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Cascade Creek below Lower Peak Lake dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.5
November	No data	No data	No data	0.1	0.3	2.7
December	No data	No data	No data	0.2	0.9	4.5
January	No data	No data	No data	0.3	1.4	5.5
February	No data	No data	No data	0.5	2.2	6.4
March	No data	No data	No data	1.9	4.0	12.6
April	No data	No data	No data	3.8	9.0	18.6
May	No data	No data	No data	3.1	12.1	24.4
June	No data	No data	No data	0.2	2.6	16.3
July	No data	No data	No data	0.0	0.1	2.7
August	No data	No data	No data	0.0	0.1	0.2
September	No data	No data	No data	0.0	0.1	0.3

Table 3-45. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in South Yuba River below Kidd Lake dam and Lower Peak Lake dam (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.4	18.9	56.0	2.0	4.4	25.4
November	3.5	15.1	137.1	3.3	12.5	120.7
December	6.6	40.0	200.6	7.6	44.7	208.7
January	12.0	59.4	247.8	15.8	66.1	256.7
February	22.0	94.2	294.1	24.5	102.0	305.2
March	84.0	181.0	563.3	90.1	189.3	578.8
April	160.9	414.0	878.2	169.7	424.4	894.8
May	183.0	651.0	1348.4	190.2	681.3	1366.1
June	14.0	186.7	1052.6	15.1	189.8	1065.0
July	5.8	10.8	228.4	2.6	10.0	241.9
August	4.9	7.9	17.0	2.0	3.0	12.3
September	6.0	12.8	37.3	2.0	3.2	13.9

Table 3-46. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) through Spaulding no. 2 powerhouse (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	1.2 ^(a)	4.2 ^(a)	6.2 ^(a)	4.8	10.3	59.4
November	1.3 ^(a)	4.4 ^(a)	6.2 ^(a)	7.8	29.9	290.1
December	1.2 ^(a)	2.3 ^(a)	6.2 ^(a)	18.3	106.7	493.1
January	1.5 ^(a)	2.4 ^(a)	11.0 ^(a)	37.9	157.5	609.5
February	1.4 ^(a)	2.5 ^(a)	21.0 ^(a)	59.5	244.4	733.1
March	1.1 ^(a)	2.4 ^(a)	34.0 ^(a)	212.3	443.8	1355.8
April	1.2 ^(a)	2.9 ^(a)	39.0 ^(a)	389.0	968.4	2033.5
May	1.6 ^(a)	6.4 ^(a)	42.0 ^(a)	439.6	1562.7	3120.4
June	1.3 ^(a)	5.0 ^(a)	44.1 ^(a)	34.9	437.2	2435.5
July	1.3 ^(a)	3.5 ^(a)	7.6 ^(a)	6.1	23.5	566.4
August	1.3 ^(a)	3.9 ^(a)	6.5 ^(a)	4.7	7.0	28.6
September	1.0 ^(a)	4.0 ^(a)	6.7 ^(a)	4.7	7.3	32.2

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-47. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the South Yuba River at Lang's Crossing below Rucker Creek (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.3	6.3	11.0	5.1	11.0	60.9
November	5.4	7.3	17.0	8.5	31.0	299.1
December	5.6	8.4	39.0	19.2	109.5	509.3
January	5.6	12.0	50.8	39.4	161.7	630.6
February	6.0	15.0	68.0	61.5	253.3	753.3
March	7.2	18.0	83.0	218.2	457.7	1389.3
April	5.8	15.0	250.7	403.3	984.0	2066.2
May	5.8	24.0	1320.0	445.5	1585.8	3164.0
June	5.6	9.9	1200.0	35.5	442.0	2460.4
July	5.3	6.6	25.8	6.5	24.2	572.5
August	5.1	6.2	8.1	4.9	7.6	29.7
September	5.3	6.6	9.8	4.9	7.8	33.2

Table 3-48. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the South Yuba River below Fall Creek (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.3	6.3	11.0	5.8	12.7	65.0
November	5.4	7.3	17.0	9.8	33.8	322.7
December	5.6	8.4	39.0	21.4	115.9	548.9
January	5.6	12.0	50.8	42.9	172.6	670.4
February	6.0	15.0	68.0	66.3	274.3	802.4
March	7.2	18.0	83.0	232.7	488.7	1464.5
April	5.8	15.0	250.7	424.9	1034.0	2147.3
May	5.8	24.0	1320.0	463.6	1635.9	3277.3
June	5.6	9.9	1200.0	36.8	453.9	2530.6
July	5.3	6.6	25.8	7.3	25.8	584.0
August	5.1	6.2	8.1	5.4	9.0	32.2
September	5.3	6.6	9.8	5.4	9.1	35.7

Table 3-49. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the South Yuba River below Canyon Creek (Drum-Spaulding Project, Spaulding No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	6.3	7.8	13.2	6.6	14.6	72.5
November	6.8	9.9	30.7	11.6	38.1	365.6
December	7.5	13.4	69.9	24.4	129.5	607.1
January	8.3	20.9	94.5	48.2	193.3	762.4
February	10.5	27.9	128.2	74.7	310.3	896.5
March	18.0	43.0	160.9	258.6	541.0	1620.8
April	23.2	51.0	286.5	469.2	1138.0	2334.3
May	15.4	80.7	1407.1	497.4	1770.8	3531.6
June	7.8	17.9	1239.0	39.6	483.0	2715.5
July	6.4	8.6	27.9	8.2	27.5	616.4
August	6.1	7.6	10.7	6.1	10.4	35.8
September	6.3	7.8	11.4	6.1	10.7	39.8

Table 3-50. Exceedance frequency analysis (10, 50, and 90 percent) for historical flow (cfs) in South Fork Deer Creek below Deer Creek powerhouse (Drum-Spaulding Project, Deer Creek Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance	50% Exceedance	10% Exceedance
	Flow (cfs)	Flow (cfs)	Flow (cfs)
	Historical	Historical	Historical
October	36.0	54.0	69.8
November	30.0	42.0	65.0
December	30.0	39.0	60.0
January	0.0	39.0	66.0
February	0.0	39.0	71.0
March	0.0	42.0	78.0
April	0.0	0.0	66.0
May	0.0	53.0	86.0
June	30.0	60.0	91.0
July	48.0	62.0	78.0
August	51.2	60.0	78.0
September	42.9	60.0	78.0

Table 3-51. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the North Fork of the North Fork American River below Lake Valley reservoir dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	3.2 ^(a)	17.0 ^(a)	31.0 ^(a)	0.2	0.4	2.4
November	5.0 ^(a)	18.0 ^(a)	30.0 ^(a)	0.4	1.4	14.3
December	10.1 ^(a)	15.1 ^(a)	27.0 ^(a)	0.9	4.9	22.9
January	7.3 ^(a)	14.5 ^(a)	28.0 ^(a)	1.7	7.5	28.6
February	3.5 ^(a)	16.0 ^(a)	28.0 ^(a)	2.8	11.9	34.0
March	5.0 ^(a)	16.0 ^(a)	30.0 ^(a)	9.8	20.7	63.0
April	1.9 ^(a)	10.0 ^(a)	29.0 ^(a)	17.8	41.6	85.0
May	0.3 ^(a)	12.0 ^(a)	43.0 ^(a)	14.2	55.4	112.6
June	2.9 ^(a)	5.3 ^(a)	29.0 ^(a)	0.8	11.6	72.5
July	1.0 ^(a)	4.2 ^(a)	19.0 ^(a)	0.1	0.4	12.3
August	2.0 ^(a)	6.0 ^(a)	20.0 ^(a)	0.2	0.3	1.0
September	2.0 ^(a)	5.3 ^(a)	22.0 ^(a)	0.2	0.3	1.3

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-52. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Sixmile Creek below Kelly Lake dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	2.0 ^(a)	3.0 ^(a)	0.0	0.1	0.3
November	0.0 ^(a)	2.5 ^(a)	5.0 ^(a)	0.0	0.2	1.8
December	0.0 ^(a)	1.0 ^(a)	3.5 ^(a)	0.1	0.6	2.8
January	0.0 ^(a)	0.0 ^(a)	2.5 ^(a)	0.2	0.9	3.5
February	0.0 ^(a)	0.0 ^(a)	5.0 ^(a)	0.4	1.5	4.2
March	0.0 ^(a)	1.5 ^(a)	5.0 ^(a)	1.2	2.6	7.7
April	0.0 ^(a)	2.0 ^(a)	5.0 ^(a)	2.2	5.0	10.3
May	0.0 ^(a)	2.1 ^(a)	5.0 ^(a)	1.7	6.7	13.6
June	0.0 ^(a)	0.5 ^(a)	5.6 ^(a)	0.1	1.4	8.7
July	0.0 ^(a)	0.0 ^(a)	1.0 ^(a)	0.0	0.1	1.5
August	0.0 ^(a)	0.0 ^(a)	0.5 ^(a)	0.0	0.0	0.1
September	0.0 ^(a)	0.0 ^(a)	1.0 ^(a)	0.0	0.0	0.2

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-53. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the North Fork of the North Fork American River below Lake Valley canal diversion dam (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	1.0 ^(a)	1.4 ^(a)	11.2 ^(a)	0.4	0.9	5.1
November	1.0 ^(a)	1.2 ^(a)	25.9 ^(a)	0.8	3.0	31.9
December	1.0 ^(a)	1.5 ^(a)	118.2 ^(a)	1.9	10.8	49.6
January	1.0 ^(a)	5.4 ^(a)	98.2 ^(a)	3.9	16.5	62.7
February	1.0 ^(a)	5.6 ^(a)	31.3 ^(a)	6.3	26.3	75.0
March	1.1 ^(a)	14.1 ^(a)	71.9 ^(a)	21.1	44.8	133.0
April	1.2 ^(a)	21.5 ^(a)	78.0 ^(a)	36.5	84.5	172.7
May	1.1 ^(a)	33.5 ^(a)	173.6 ^(a)	28.7	111.9	229.4
June	3.0 ^(a)	3.4 ^(a)	59.2 ^(a)	1.5	22.4	144.9
July	3.0 ^(a)	3.2 ^(a)	5.7 ^(a)	0.2	0.8	24.8
August	3.0 ^(a)	3.2 ^(a)	3.9 ^(a)	0.3	0.6	2.0
September	3.0 ^(a)	3.4 ^(a)	8.1 ^(a)	0.4	0.6	2.6

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-54. Exceedance frequency analysis (10, 50, and 90 percent) for historical flow (cfs) from the Bear River below Drum canal spillway gate (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical
October	0.0 ^(a)	0.0 ^(a)	0.0 ^(a)
November	0.0 ^(a)	0.0 ^(a)	0.0 ^(a)
December	0.0 ^(a)	0.0 ^(a)	75.0 ^(a)
January	0.0 ^(a)	0.0 ^(a)	0.0 ^(a)
February	0.0 ^(a)	0.0 ^(a)	75.0 ^(a)
March	0.0 ^(a)	0.0 ^(a)	194.8 ^(a)
April	0.0 ^(a)	0.0 ^(a)	200.5 ^(a)
May	0.0 ^(a)	50.0 ^(a)	324.5 ^(a)
June	0.0 ^(a)	5.5 ^(a)	185.0 ^(a)
July	0.0 ^(a)	0.0 ^(a)	60.0 ^(a)
August	0.0 ^(a)	0.0 ^(a)	0.0 ^(a)
September	0.0 ^(a)	0.0 ^(a)	0.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-55. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 (Drum-Spaulding Project, Drum No. 1 and No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.6 ^(a)	7.1 ^(a)	12.4 ^(a)	0.2	0.5	1.0
November	5.8 ^(a)	7.4 ^(a)	20.0 ^(a)	0.4	0.8	4.2
December	5.9 ^(a)	8.3 ^(a)	36.0 ^(a)	0.6	1.7	8.8
January	5.9 ^(a)	9.9 ^(a)	72.5 ^(a)	0.9	2.5	12.5
February	6.6 ^(a)	12.2 ^(a)	127.5 ^(a)	1.3	4.6	14.0
March	8.0 ^(a)	17.0 ^(a)	203.6 ^(a)	3.1	7.4	18.0
April	7.5 ^(a)	19.0 ^(a)	226.3 ^(a)	4.6	9.1	17.2
May	6.4 ^(a)	77.5 ^(a)	264.0 ^(a)	2.6	9.8	20.8
June	6.5 ^(a)	11.7 ^(a)	158.0 ^(a)	0.5	2.3	11.1
July	5.5 ^(a)	7.9 ^(a)	83.1 ^(a)	0.2	0.7	2.7
August	5.6 ^(a)	7.3 ^(a)	25.3 ^(a)	0.2	0.5	0.9
September	5.9 ^(a)	7.4 ^(a)	19.0 ^(a)	0.2	0.4	0.8

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-56. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Canyon Creek below Towle canal diversion dam (Drum-Spaulding Project, Alta Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	0.2 ^(a)	1.1 ^(a)	0.3	0.7	1.1
November	0.1 ^(a)	0.4 ^(a)	1.1 ^(a)	0.5	0.9	3.0
December	0.2 ^(a)	0.9 ^(a)	1.2 ^(a)	0.7	1.4	7.3
January	0.3 ^(a)	1.0 ^(a)	1.2 ^(a)	0.8	2.0	11.6
February	0.5 ^(a)	1.1 ^(a)	1.2 ^(a)	1.1	3.7	13.7
March	1.0 ^(a)	1.1 ^(a)	1.2 ^(a)	2.3	5.9	16.2
April	0.9 ^(a)	1.1 ^(a)	1.2 ^(a)	2.6	6.0	13.2
May	0.4 ^(a)	1.0 ^(a)	1.2 ^(a)	1.5	4.4	13.4
June	0.3 ^(a)	1.0 ^(a)	1.2 ^(a)	0.6	1.8	5.7
July	0.1 ^(a)	0.6 ^(a)	1.1 ^(a)	0.3	0.9	2.2
August	0.0 ^(a)	0.3 ^(a)	1.1 ^(a)	0.2	0.6	1.2
September	0.0 ^(a)	0.3 ^(a)	1.2 ^(a)	0.2	0.5	1.0

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-57. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Little Bear River below Alta powerhouse tailrace (Drum-Spaulding Project, Alta Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	0.2 ^(a)	0.3 ^(a)	0.3	0.7	1.2
November	0.0 ^(a)	0.2 ^(a)	1.1 ^(a)	0.5	0.9	2.7
December	0.2 ^(a)	0.7 ^(a)	10.0 ^(a)	0.7	1.3	6.8
January	0.2 ^(a)	2.0 ^(a)	20.0 ^(a)	0.8	1.8	11.5
February	0.6 ^(a)	6.7 ^(a)	29.4 ^(a)	1.0	3.4	13.7
March	1.2 ^(a)	6.2 ^(a)	24.0 ^(a)	2.0	5.3	16.2
April	0.2 ^(a)	3.3 ^(a)	22.6 ^(a)	1.5	5.0	12.5
May	0.1 ^(a)	0.4 ^(a)	17.4 ^(a)	1.1	2.8	12.1
June	0.1 ^(a)	0.2 ^(a)	2.1 ^(a)	0.6	1.5	4.1
July	0.0 ^(a)	0.2 ^(a)	0.3 ^(a)	0.3	1.0	2.0
August	0.0 ^(a)	0.2 ^(a)	0.4 ^(a)	0.2	0.7	1.2
September	0.0 ^(a)	0.2 ^(a)	0.4 ^(a)	0.2	0.6	1.0

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-58. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the Bear River below Drum afterbay (Drum-Spaulding Project, Dutch Flat No. 1 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	5.1 ^(a)	6.0 ^(a)	9.2 ^(a)	2.1	4.8	8.6
November	5.1	5.9	8.0	3.8	7.2	28.3
December	5.1 ^(a)	6.0 ^(a)	7.0 ^(a)	5.6	11.6	59.1
January	5.1 ^(a)	6.0 ^(a)	7.3 ^(a)	6.5	17.6	92.7
February	5.2 ^(a)	6.1 ^(a)	16.5 ^(a)	8.7	31.1	109.0
March	5.5 ^(a)	10.0 ^(a)	46.0 ^(a)	20.4	51.7	128.4
April	5.5 ^(a)	10.0 ^(a)	70.0 ^(a)	24.5	54.8	113.7
May	5.6 ^(a)	10.0 ^(a)	13.0 ^(a)	13.9	47.1	117.1
June	5.4 ^(a)	10.0 ^(a)	13.0 ^(a)	4.6	15.5	57.3
July	5.3 ^(a)	10.0 ^(a)	13.0 ^(a)	2.3	6.5	18.5
August	5.3 ^(a)	10.0 ^(a)	13.0 ^(a)	1.5	4.4	8.3
September	5.3 ^(a)	11.0 ^(a)	13.0 ^(a)	1.6	4.0	7.2

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-59. Exceedance frequency analysis (10, 50, and 90 percent) for historical flow (cfs) in Bear River diversion dam and Bear River canal (Drum-Spaulding Project, Halsey Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance	50% Exceedance	10% Exceedance
	Flow (cfs)	Flow (cfs)	Flow (cfs)
	Historical	Historical	Historical
October	0.0	400.0	476.8
November	2.9	243.0	473.1
December	85.4	398.0	483.0
January	151.0	377.0	480.0
February	118.2	380.0	477.0
March	122.2	412.0	478.0
April	139.5	424.0	483.1
May	274.2	434.0	478.0
June	341.9	435.5	476.0
July	370.0	444.0	470.0
August	374.0	446.0	474.0
September	269.9	442.0	475.1

Table 3-60. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Dry Creek below Halsey afterbay dam (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.4	0.9	1.4
November	No data	No data	No data	0.7	1.2	3.3
December	No data	No data	No data	0.9	1.5	8.3
January	No data	No data	No data	1.0	2.2	14.1
February	No data	No data	No data	1.3	4.1	16.8
March	No data	No data	No data	2.4	6.5	19.9
April	No data	No data	No data	1.9	6.1	15.3
May	No data	No data	No data	1.3	3.4	14.9
June	No data	No data	No data	0.8	1.9	5.0
July	No data	No data	No data	0.4	1.2	2.4
August	No data	No data	No data	0.3	0.8	1.5
September	No data	No data	No data	0.3	0.7	1.3

Table 3-61. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Rock Creek below Rock Creek diversion dam (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.0 ^(a)	0.2 ^(a)	8.4 ^(a)	0.3	0.6	1.0
November	0.0 ^(a)	0.2 ^(a)	34.9 ^(a)	0.4	0.8	2.2
December	0.0 ^(a)	0.2 ^(a)	30.4 ^(a)	0.6	1.0	5.5
January	0.0 ^(a)	0.1 ^(a)	12.7 ^(a)	0.6	1.5	9.3
February	0.0 ^(a)	0.2 ^(a)	39.1 ^(a)	0.8	2.7	11.1
March	0.1 ^(a)	0.2 ^(a)	9.4 ^(a)	1.6	4.3	13.2
April	0.1 ^(a)	0.2 ^(a)	8.8 ^(a)	1.3	4.0	10.1
May	0.0 ^(a)	0.2 ^(a)	25.0 ^(a)	0.9	2.3	9.9
June	0.0 ^(a)	0.2 ^(a)	25.9 ^(a)	0.5	1.3	3.3
July	0.0 ^(a)	0.3 ^(a)	25.0 ^(a)	0.3	0.8	1.6
August	0.0 ^(a)	0.2 ^(a)	25.0 ^(a)	0.2	0.5	1.0
September	0.0 ^(a)	0.2 ^(a)	19.5 ^(a)	0.2	0.5	0.9

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-62. Exceedance frequency analysis (10, 50, and 90 percent) for historical flow (cfs) in Auburn Ravine (Drum-Spaulding Project, Wise and Wise No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical
October	2.3	159.0	319.0
November	1.2	38.5	331.0
December	15.0	298.0	342.1
January	24.0	290.8	336.0
February	20.8	287.5	339.8
March	46.9 ^(a)	300.2 ^(a)	339.0 ^(a)
April	11.0	239.2	334.0
May	12.0	161.2	255.0
June	13.0	100.0	216.0
July	10.0 ^(a)	34.5 ^(a)	143.0 ^(a)
August	11.0	71.0	168.0
September	13.0	171.0	278.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-63. Exceedance frequency analysis (10, 50, and 90 percent) for flow (cfs) through Mormon Ravine (Drum-Spaulding Project, Newcastle Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical
October	0.0 ^(a)	0.0 ^(a)	235.0 ^(a)
November	0.0 ^(a)	0.0 ^(a)	303.0 ^(a)
December	0.0 ^(a)	278.0 ^(a)	321.0 ^(a)
January	0.0 ^(a)	276.1 ^(a)	312.0 ^(a)
February	53.2 ^(a)	272.0 ^(a)	309.0 ^(a)
March	33.8 ^(a)	271.0 ^(a)	306.0 ^(a)
April	0.0 ^(a)	221.0 ^(a)	277.0 ^(a)
May	0.0 ^(a)	125.0 ^(a)	215.0 ^(a)
June	0.0 ^(a)	37.0 ^(a)	177.0 ^(a)
July	0.0 ^(a)	0.0 ^(a)	62.0 ^(a)
August	0.0 ^(a)	0.0 ^(a)	127.0 ^(a)
September	0.0 ^(a)	148.0 ^(a)	209.1 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-64. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Jackson Meadows reservoir (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	19,468.6	39,137.9	50,546.6
November	17,744.7	33,760.1	42,217.2
December	17,936.7	33,377.8	39,860.5
January	18,147.7	34,170.8	53,337.5
February	15,643.1	34,626.0	53,337.5
March	16,301.3	34,902.1	53,530.0
April	24,123.1	38,939.8	54,011.3
May	34,050.6	54,107.7	67,200.7
June	38,460.4	63,047.6	68,130.2
July	33,397.0	62,189.6	67,730.2
August	24,633.7	55,214.0	67,219.8
September	22,895.9	47,470.7	61,523.4

Table 3-65. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Milton diversion dam impoundment (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	157.0	193.0	220.0
November	160.0	177.0	229.0
December	157.0	165.0	221.8
January	157.0	165.0	221.0
February	157.0	166.0	294.0
March	157.0	167.0	295.0
April	157.0	168.0	295.0
May	160.0	192.9	295.0
June	161.0	198.0	295.0
July	161.0	189.0	252.0
August	157.0	193.0	215.0
September	159.0	193.0	220.0

Table 3-66. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Jackson Lake (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	393.2	900.0	1,054.8
November	410.0	882.0	1,030.0
December	414.0	868.0	1,110.0
January	387.0 ^(a)	848.0 ^(a)	1,262.7 ^(a)
February	377.0 ^(a)	866.0 ^(a)	1,330.0 ^(a)
March	387.0 ^(a)	867.0 ^(a)	1,330.0 ^(a)
April	400.0	912.0	1,330.0
May	662.2	1,200.0	1,350.0
June	912.0	1,330.0	1,350.0
July	813.0	1,240.0	1,337.0
August	699.2	1,120.0	1,250.8
September	556.4	1,000.5	1,135.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-67. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in French Lake (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	1,743.2	7,100.0	12,011.0
November	1,695.8	6,723.5	11,781.2
December	2,322.6	7,560.0	12,075.0
January	2,843.2	7,864.0	13,840.0
February	2,976.0	8,097.0	13,840.0
March	2,088.2	8,890.0	13,840.0
April	3,721.4	10,920.5	13,840.0
May	7,659.8	13,400.0	14,100.0
June	5,924.3	13,840.0	14,135.9
July	4,177.0	13,600.0	13,900.0
August	2,258.0	12,000.0	13,542.2
September	1,936.8	8,909.5	12,865.3

Table 3-68. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Faucherie Lake (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	965.0	3,721.0	4,005.8
November	783.2 ^(a)	3,230.0 ^(a)	3,997.0 ^(a)
December	1,480.1 ^(a)	3,460.0 ^(a)	3,995.1 ^(a)
January	1,847.1 ^(a)	3,980.0 ^(a)	4,000.9 ^(a)
February	2,328.4 ^(a)	3,989.5 ^(a)	4,010.0 ^(a)
March	2,892.8 ^(a)	3,990.0 ^(a)	4,018.7 ^(a)
April	3,459.4 ^(a)	4,001.1 ^(a)	4,030.9 ^(a)
May	3,910.1 ^(a)	4,022.0 ^(a)	4,060.0 ^(a)
June	3,976.6 ^(a)	4,010.0 ^(a)	4,047.0 ^(a)
July	2,987.0 ^(a)	3,989.0 ^(a)	4,034.0 ^(a)
August	1,434.0	3,980.0	4,023.0
September	954.9	3,975.0	4,020.0

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-69. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Sawmill Lake (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	965.7 ^(a)	2,398.3 ^(a)	3,030.0 ^(a)
November	1,098.1	2,332.4	3,030.0
December	1,469.5	2,860.3	3,030.0
January	1,687.0	3,030.0	3,068.0
February	2,159.4	3,030.0	3,070.0
March	3,030.0	3,030.0	3,080.0
April	3,030.0 ^(a)	3,030.0 ^(a)	3,090.0 ^(a)
May	3,030.0 ^(a)	3,030.0 ^(a)	3,100.0 ^(a)
June	3,030.0 ^(a)	3,030.0 ^(a)	3,080.0 ^(a)
July	2,662.9 ^(a)	3,030.0 ^(a)	3,030.0 ^(a)
August	1,391.1 ^(a)	3,028.2 ^(a)	3,030.0 ^(a)
September	506.8 ^(a)	2,727.7 ^(a)	3,030.0 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-70. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Bowman Lake (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	25,607.7	45,835.3	53,352.5
November	25,024.2	42,368.0	52,464.0
December	26,598.1	37,317.0	51,020.6
January	24,489.7	31,821.1	61,298.3
February	22,665.1	32,475.8	56,384.3
March	22,259.3	34,587.7	57,923.0
April	25,781.4	42,160.5	57,414.1
May	36,335.0	52,841.0	67,862.1
June	42,892.8	64,290.7	69,893.2
July	43,110.7	60,478.0	67,636.5
August	41,083.3	51,958.8	62,488.8
September	30,720.7	45,346.9	57,500.4

Table 3-71. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Dutch Flat afterbay (Yuba-Bear Project, Chicago Park Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	1,556.0 ^(a)	1,807.0 ^(a)	1,974.6 ^(a)
November	1,616.3 ^(a)	1,827.5 ^(a)	1,971.0 ^(a)
December	1,665.8 ^(a)	1,856.0 ^(a)	2,006.0 ^(a)
January	1,700.0 ^(a)	1,863.0 ^(a)	2,074.5 ^(a)
February	1,743.0 ^(a)	1,873.0 ^(a)	2,067.0 ^(a)
March	1,670.0 ^(a)	1,913.0 ^(a)	2,087.0 ^(a)
April	1,734.8 ^(a)	1,971.0 ^(a)	2,085.4 ^(a)
May	1,779.3 ^(a)	1,932.0 ^(a)	2,082.0 ^(a)
June	1,755.8 ^(a)	1,856.0 ^(a)	2,001.0 ^(a)
July	1,760.0 ^(a)	1,854.5 ^(a)	1,979.0 ^(a)
August	1,720.0 ^(a)	1,834.0 ^(a)	1,968.0 ^(a)
September	1,304.0 ^(a)	1,571.0 ^(a)	1,920.6 ^(a)

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-72. Exceedance frequency analysis (10, 50, and 90 percent) for storage (acre-feet) in Rollins reservoir (Yuba-Bear Project, Rollins Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Storage (ac-ft)	50% Exceedance Storage (ac-ft)	10% Exceedance Storage (ac-ft)
October	23,415.6	36,093.0	47,178.2
November	26,671.1	44,960.0	58,757.0
December	30,046.8	47,196.0	59,165.0
January	28,077.6	50,792.0	59,470.0
February	33,323.8	57,147.0	59,671.0
March	42,747.0	59,063.0	59,671.0
April	45,851.1	59,165.0	59,521.3
May	44,809.8	59,050.0	59,369.0
June	40,876.1	58,372.0	59,169.7
July	41,322.4	56,406.0	58,961.0
August	37,627.0	54,347.0	58,175.0
September	33,041.3	48,359.0	56,994.0

Table 3-73. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the Middle Yuba River below Jackson Meadows dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Middle Yuba River below Jackson Meadows Dam						
Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	8.0 ^(a)	144.0 ^(a)	304.0 ^(a)	1.8	5.3	17.1
November	7.9 ^(a)	11.0 ^(a)	283.1 ^(a)	2.2	9.1	60.3
December	4.2 ^(a)	9.3 ^(a)	133.0 ^(a)	6.1	18.3	121.7
January	4.7 ^(a)	9.5 ^(a)	91.5 ^(a)	8.6	30.5	152.1
February	4.8 ^(a)	10.0 ^(a)	182.0 ^(a)	13.5	45.4	144.6
March	6.3 ^(a)	70.0 ^(a)	206.5 ^(a)	33.6	85.3	264.8
April	8.2 ^(a)	76.0 ^(a)	257.0 ^(a)	75.6	202.6	435.9
May	8.8 ^(a)	106.0 ^(a)	389.5 ^(a)	99.6	355.9	770.7
June	5.6 ^(a)	108.0 ^(a)	362.0 ^(a)	16.4	110.3	547.9
July	5.0 ^(a)	104.0 ^(a)	177.8 ^(a)	5.0	13.3	114.3
August	5.0 ^(a)	99.0 ^(a)	159.0 ^(a)	3.4	6.2	13.7
September	6.0 ^(a)	145.5 ^(a)	263.0 ^(a)	1.3	5.3	13.6

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-74. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the Middle Yuba River below Milton diversion dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	3.3	3.8	4.3	1.9	5.7	18.4
November	3.2 ^(a)	3.7 ^(a)	4.2 ^(a)	2.4	9.9	65.2
December	3.2 ^(a)	3.7 ^(a)	4.2 ^(a)	6.7	19.9	132.1
January	3.0 ^(a)	3.6 ^(a)	4.6 ^(a)	9.4	33.3	165.4
February	3.0 ^(a)	3.8 ^(a)	6.0 ^(a)	14.7	49.6	159.2
March	2.6 ^(a)	3.9 ^(a)	5.0 ^(a)	36.6	92.9	284.6
April	2.2 ^(a)	3.8 ^(a)	73.0 ^(a)	81.5	217.1	468.4
May	2.0 ^(a)	4.0 ^(a)	385.2 ^(a)	105.5	378.1	817.2
June	3.2 ^(a)	3.9 ^(a)	276.0 ^(a)	17.2	115.7	578.3
July	3.2 ^(a)	3.8 ^(a)	5.3 ^(a)	5.2	13.7	119.4
August	3.2	3.8	4.5	3.6	6.7	14.7
September	3.4 ^(a)	3.8 ^(a)	4.5 ^(a)	1.4	5.6	14.6

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-75. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Wilson Creek below Wilson Creek diversion dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.5
November	No data	No data	No data	0.1	0.2	2.5
December	No data	No data	No data	0.1	0.9	4.1
January	No data	No data	No data	0.3	1.3	5.0
February	No data	No data	No data	0.5	2.0	5.9
March	No data	No data	No data	1.7	3.7	11.3
April	No data	No data	No data	3.4	8.0	16.6
May	No data	No data	No data	2.8	10.9	22.0
June	No data	No data	No data	0.2	2.4	14.6
July	No data	No data	No data	0.0	0.1	2.6
August	No data	No data	No data	0.0	0.1	0.2
September	No data	No data	No data	0.0	0.1	0.2

Table 3-76. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Jackson Creek below Jackson Lake dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.9 ^(a)	1.2 ^(a)	1.8 ^(a)	0.0	0.1	0.4
November	0.9 ^(a)	1.2 ^(a)	1.8 ^(a)	0.0	0.2	1.7
December	0.9 ^(a)	1.3 ^(a)	1.7 ^(a)	0.1	0.6	2.9
January	0.9 ^(a)	1.3 ^(a)	1.7 ^(a)	0.2	0.9	3.6
February	0.9 ^(a)	1.3 ^(a)	1.7 ^(a)	0.3	1.4	4.2
March	0.9 ^(a)	1.4 ^(a)	1.8 ^(a)	1.3	2.7	8.2
April	0.9 ^(a)	1.3 ^(a)	1.7 ^(a)	2.4	6.1	12.9
May	0.9 ^(a)	1.5 ^(a)	2.0 ^(a)	2.7	9.7	19.5
June	0.9 ^(a)	1.6 ^(a)	2.0 ^(a)	0.2	2.7	15.3
July	1.0 ^(a)	1.6 ^(a)	2.0 ^(a)	0.0	0.1	3.4
August	0.9 ^(a)	1.2 ^(a)	1.9 ^(a)	0.0	0.0	0.2
September	0.9 ^(a)	1.2 ^(a)	1.8 ^(a)	0.0	0.0	0.2

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-77. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Canyon Creek below French Lake dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	2.8 ^(a)	3.0 ^(a)	3.2 ^(a)	0.2	0.4	2.4
November	2.9 ^(a)	3.1 ^(a)	3.2 ^(a)	0.3	1.2	11.3
December	2.7 ^(a)	3.1 ^(a)	3.2 ^(a)	0.7	4.1	19.0
January	2.8 ^(a)	3.0 ^(a)	3.2 ^(a)	1.4	6.0	23.3
February	2.8 ^(a)	3.1 ^(a)	3.2 ^(a)	2.2	9.1	27.6
March	2.8 ^(a)	3.2 ^(a)	3.2 ^(a)	8.0	17.3	52.7
April	2.8 ^(a)	3.0 ^(a)	3.2 ^(a)	15.7	40.5	86.0
May	2.9 ^(a)	3.2 ^(a)	3.2 ^(a)	19.3	68.5	136.4
June	2.9 ^(a)	3.2 ^(a)	3.2 ^(a)	1.6	20.1	113.3
July	2.8 ^(a)	3.1 ^(a)	3.2 ^(a)	0.3	1.1	26.5
August	2.8 ^(a)	2.9 ^(a)	3.1 ^(a)	0.2	0.3	1.2
September	2.7 ^(a)	3.0 ^(a)	3.2 ^(a)	0.2	0.3	1.3

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-78. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Canyon Creek below Faucherie Lake dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	2.8 ^(a)	2.9 ^(a)	3.2 ^(a)	0.4	0.8	4.7
November	2.9 ^(a)	3.0 ^(a)	3.3 ^(a)	0.6	2.3	22.0
December	2.9 ^(a)	3.0 ^(a)	3.3 ^(a)	1.4	8.0	37.8
January	2.8 ^(a)	3.0 ^(a)	3.3 ^(a)	2.8	11.8	45.9
February	2.8 ^(a)	3.0 ^(a)	3.2 ^(a)	4.4	18.0	54.3
March	2.8 ^(a)	2.9 ^(a)	3.3 ^(a)	16.0	33.9	104.2
April	2.8 ^(a)	2.9 ^(a)	3.3 ^(a)	30.6	78.6	167.3
May	2.7 ^(a)	2.9 ^(a)	3.3 ^(a)	36.1	128.6	257.6
June	2.8 ^(a)	2.9 ^(a)	3.1 ^(a)	3.0	36.8	206.8
July	2.8 ^(a)	2.9 ^(a)	3.2 ^(a)	0.5	2.0	47.4
August	2.8 ^(a)	2.9 ^(a)	3.2 ^(a)	0.4	0.6	2.3
September	1.3 ^(a)	2.9 ^(a)	3.2 ^(a)	0.4	0.6	2.6

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-79. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Canyon Creek below Sawmill Lake dam (Yuba-Bear Project, Bowman Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	3.0 ^(a)	3.6 ^(a)	6.5 ^(a)	0.7	1.5	8.8
November	3.0 ^(a)	3.7 ^(a)	31.0 ^(a)	1.1	4.4	43.3
December	2.9 ^(a)	3.7 ^(a)	57.0 ^(a)	2.7	15.8	73.2
January	2.9 ^(a)	4.0 ^(a)	14.0 ^(a)	5.5	23.5	90.5
February	2.9 ^(a)	4.1 ^(a)	9.5 ^(a)	8.7	36.4	107.7
March	2.9 ^(a)	4.2 ^(a)	8.8 ^(a)	31.7	67.3	207.5
April	2.9 ^(a)	4.0 ^(a)	8.8 ^(a)	61.4	151.7	315.4
May	2.8 ^(a)	3.4 ^(a)	8.2 ^(a)	63.2	231.3	462.6
June	2.9 ^(a)	4.0 ^(a)	6.1 ^(a)	4.7	61.4	352.7
July	2.9 ^(a)	3.5 ^(a)	6.1 ^(a)	0.8	3.0	74.8
August	2.9 ^(a)	4.0 ^(a)	29.0 ^(a)	0.7	1.0	4.1
September	2.9 ^(a)	4.1 ^(a)	36.2 ^(a)	0.7	1.1	4.8

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-80. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Canyon Creek below Bowman-Spaulding diversion dam (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	2.6	4.4	6.7	1.2	2.6	15.0
November	2.1	4.1	7.3	2.0	7.7	78.4
December	2.2	4.2	10.0	4.9	28.0	129.3
January	2.3	4.7	26.0	9.9	42.2	163.8
February	2.5	5.0	48.0	15.6	66.1	194.8
March	3.0	6.3	117.4	55.7	118.6	361.2
April	3.3	5.5	145.1	105.3	255.2	525.2
May	3.0	5.1	269.2	100.8	379.0	753.0
June	3.2	4.9	230.1	7.0	94.0	549.1
July	2.6	4.5	10.0	1.2	4.4	115.1
August	2.6	4.3	6.6	1.1	1.7	6.7
September	2.7	4.2	6.6	1.2	1.8	8.0

Table 3-81. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Texas Creek at Texas Creek diversion dam (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.2	0.5	2.9
November	No data	No data	No data	0.4	1.5	16.1
December	No data	No data	No data	1.0	5.6	26.5
January	No data	No data	No data	2.0	8.6	32.5
February	No data	No data	No data	3.1	13.3	38.7
March	No data	No data	No data	11.2	23.8	72.7
April	No data	No data	No data	21.7	51.1	105.4
May	No data	No data	No data	17.9	69.8	140.9
June	No data	No data	No data	1.1	15.4	94.0
July	No data	No data	No data	0.2	0.6	16.9
August	No data	No data	No data	0.2	0.3	1.2
September	No data	No data	No data	0.2	0.3	1.5

Table 3-82. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Clear Creek below Bowman-Spaulding conduit (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.1	0.2	0.8
November	No data	No data	No data	0.1	0.5	5.6
December	No data	No data	No data	0.3	1.9	8.6
January	No data	No data	No data	0.7	2.9	11.1
February	No data	No data	No data	1.1	4.7	13.3
March	No data	No data	No data	3.6	7.8	22.4
April	No data	No data	No data	5.8	13.3	27.3
May	No data	No data	No data	4.5	17.6	36.6
June	No data	No data	No data	0.2	3.3	22.1
July	No data	No data	No data	0.0	0.1	3.8
August	No data	No data	No data	0.1	0.1	0.3
September	No data	No data	No data	0.1	0.1	0.4

Table 3-83. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Fall Creek below Fall Creek diversion dam (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	0.7 ^(a)	2.0 ^(a)	4.3 ^(a)	0.0	0.0	0.3
November	0.5 ^(a)	2.2 ^(a)	5.0 ^(a)	0.0	0.1	1.4
December	0.4 ^(a)	0.8 ^(a)	2.1 ^(a)	0.1	0.5	2.3
January	0.3 ^(a)	0.4 ^(a)	1.0 ^(a)	0.2	0.7	2.8
February	0.3 ^(a)	0.4 ^(a)	0.7 ^(a)	0.3	1.1	3.4
March	0.3 ^(a)	0.8 ^(a)	0.9 ^(a)	1.0	2.1	6.6
April	0.5 ^(a)	1.0 ^(a)	414.6 ^(a)	2.0	4.8	9.9
May	0.6 ^(a)	1.2 ^(a)	293.8 ^(a)	1.8	6.8	13.6
June	0.5 ^(a)	1.0 ^(a)	4.9 ^(a)	0.1	1.6	9.6
July	0.5 ^(a)	0.8 ^(a)	2.0 ^(a)	0.0	0.1	1.8
August	0.4 ^(a)	0.7 ^(a)	1.0 ^(a)	0.0	0.0	0.1
September	0.5 ^(a)	1.1 ^(a)	3.2 ^(a)	0.0	0.0	0.1

^(a) Denotes missing data within the given period (statistics will not be completely accurate but are provided for approximate reference).

Table 3-84. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Trap Creek below Bowman-Spaulding conduit (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.0	0.1	0.3
November	No data	No data	No data	0.1	0.2	2.2
December	No data	No data	No data	0.1	0.8	3.4
January	No data	No data	No data	0.3	1.2	4.5
February	No data	No data	No data	0.5	1.9	5.4
March	No data	No data	No data	1.4	3.1	9.0
April	No data	No data	No data	2.3	5.3	10.8
May	No data	No data	No data	1.8	7.0	14.5
June	No data	No data	No data	0.1	1.3	8.7
July	No data	No data	No data	0.0	0.1	1.5
August	No data	No data	No data	0.0	0.0	0.1
September	No data	No data	No data	0.0	0.0	0.2

Table 3-85. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Rucker Creek below Bowman-Spaulding conduit (Yuba-Bear Project, Dutch Flat No. 2 Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	No data	No data	No data	0.1	0.2	1.0
November	No data	No data	No data	0.2	0.6	6.6
December	No data	No data	No data	0.4	2.2	10.1
January	No data	No data	No data	0.8	3.4	13.0
February	No data	No data	No data	1.3	5.5	15.6
March	No data	No data	No data	4.2	9.1	26.5
April	No data	No data	No data	6.8	15.7	32.4
May	No data	No data	No data	5.4	20.9	43.3
June	No data	No data	No data	0.3	4.0	26.3
July	No data	No data	No data	0.0	0.2	4.5
August	No data	No data	No data	0.1	0.1	0.4
September	No data	No data	No data	0.1	0.1	0.5

Table 3-86. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in Bear River below Dutch Flat afterbay dam (Yuba-Bear Project, Chicago Park Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	9.7	11.0	13.0	3.9	9.0	15.3
November	5.2	6.5	12.0	6.9	12.6	42.6
December	5.2	6.5	13.0	9.9	19.1	99.9
January	5.3	6.5	14.0	11.3	28.1	158.6
February	5.3	6.3	15.8	14.8	51.2	188.4
March	5.4	6.5	70.8	32.3	82.6	222.2
April	5.5	7.1	128.0	36.1	82.9	182.0
May	6.3	11.0	16.0	20.3	62.9	185.4
June	6.3	11.0	12.0	8.4	24.9	80.5
July	6.3	11.0	37.6	4.4	12.1	30.2
August	9.9	11.0	34.0	2.8	8.2	15.6
September	10.0	12.0	45.0	3.0	7.4	13.2

Table 3-87. Exceedance frequency analysis (10, 50, and 90 percent) for historical and estimated unregulated flow (cfs) in the Bear River below Rollins dam (Yuba-Bear Project, Rollins Development) for period of record (WY 1976-2008). (Source: appendix E12 of PGE, 2011a; NID, 2011a)

Month	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)	90% Exceedance Flow (cfs)	50% Exceedance Flow (cfs)	10% Exceedance Flow (cfs)
	Historical	Historical	Historical	Unregulated	Unregulated	Unregulated
October	65.2	83.0	290.8	18.5	41.4	69.7
November	19.9	27.0	470.0	31.1	56.6	174.8
December	20.0	30.0	734.0	44.5	84.5	448.6
January	19.0	234.0	1,248.0	52.0	132.5	759.5
February	19.0	434.0	1,670.0	70.5	223.7	916.2
March	21.0	576.0	1,650.0	133.5	353.7	1,012.9
April	24.0	584.5	1,400.0	128.9	335.9	775.9
May	78.2	507.0	996.0	75.0	214.3	774.6
June	83.9	407.0	673.0	36.8	103.6	296.7
July	80.0	152.0	458.8	20.3	55.7	125.9
August	83.0	142.0	361.0	12.5	38.1	69.5
September	75.0	100.0	350.0	14.8	35.5	63.7

Table 3-88. NID's water rights associated with the Yuba-Bear Hydroelectric Project. (Source: NID, 2011a)

License, Permit, Application, or Statement No.	Source	Priority Date	Place of Storage or Diversion	Direct Diversion Amount (cfs)	Storage Amount (acre-feet)
S4716	Canyon Creek	1873	Sawmill Lake		
S4717	Canyon Creek	1859	French Lake		
S13330	Middle Yuba River	1854	Milton diversion impoundment		
S1 3800	Canyon Creek	1872	Bowman reservoir		
S1 3801	Canyon Creek	1872	Faucherie Lake		
S13927	South Yuba River	1874	PG&E's South Yuba canal	Not applicable (pre-1914 rights)	
S1 3928	South Yuba River	1874	PG&E's Drum canal		
S14354	Bear River	1853	Rollins reservoir		
S14355	Bear River	1853	PG&E's Bear River canal		
S14356	Canyon Creek	1872	Bowman reservoir		
12795 (7/10/1991)	Jackson Creek	5/7/1919	Jackson Lake	---	970 (1/1-12/31)
	Canyon Creek		Faucherie Lake	---	3980 (1/1-12/31)
	Canyon Creek		Sawmill Lake	---	1221 (1/1-12/31)
	Canyon Creek		Bowman Lake	---	58829 (1/1-12/31)
	Canyon Creek		Bowman-Spaulding conduit	146 (4/15-9/30)	---
	Texas Creek		Bowman-Spaulding conduit	30 (4/15-9/30)	---

Table 3-88. NID's water rights associated with the Yuba-Bear Hydroelectric Project. (Source: NID, 2011a)

License, Permit, Application, or Statement No.	Source	Priority Date	Place of Storage or Diversion	Direct Diversion Amount (cfs)	Storage Amount (acre-feet)
	Fall Creek		Bowman- Spaulding conduit	15 (4/15-9/30)	---
	Trap Creek		Bowman- Spaulding conduit	5 (4/15-9/30)	---
12796 (7/10/1991)	Middle Yuba River	3/25/1921	Jackson Meadows and Bowman reservoirs	---	60,000 (1/1- 12/31)
12797 (7/10/1991)	Middle Yuba River	3/25/1921	Jackson Meadows and Bowman reservoirs	---	60,000 (12/1-7/15)
12798 (7/10/1991)	Jackson Creek	6/3/1921	Jackson Lake	---	970 (12/1- 7/15)
	Canyon Creek		Faucherie Lake	---	2,993 (12/1- 7/15)
	Canyon Creek		Sawmill Lake	---	3,030 (12/1- 7/15)
	Canyon Creek		Bowman reservoir	---	47,530 (12/1-7/15)
	Canyon Creek		Bowman- Spaulding conduit	152 (1/1-12/31)	---
	Texas Creek		Bowman- Spaulding conduit	30 (1/1-12/31)	---
	Fall Creek		Bowman- Spaulding conduit	15 (1/1-12/31)	---
	Trap Creek		Bowman- Spaulding conduit	5 (1/1-12/31)	---

Table 3-88. NID's water rights associated with the Yuba-Bear Hydroelectric Project. (Source: NID, 2011a)

License, Permit, Application, or Statement No.	Source	Priority Date	Place of Storage or Diversion	Direct Diversion Amount (cfs)	Storage Amount (acre-feet)
10350 (11/26/1968)	Bear River	11/22/1921	Rollins reservoir	---	6,945 (11/30-6/1)
Permit No. 11626 (Lic. In Progress)	Bear River	11/22/1921	Rollins reservoir	---	65,000 (11/30-6/1)
Permit No. 13770 (Lic. In Progress)	Middle Yuba River	9/8/1926	Jackson Meadows, Milton and Bowman reservoirs	---	50,000 (1/1-6/30, 10/1-12/1))
8809 (1/20/1964)	Bear River	3/26/1 929	Bear River canal	120 (4/1-10/31)	---
4544 (2/11/1957)	Middle Yuba River, Canyon Creek & others not listed	11/7/1934	PG&E's Drum canal	135 (1/1-12/31)	---
1707 (12/15/1936)	Middle Yuba River, Canyon Creek & others not listed	11/7/1924	PG&E's South Yuba canal	126 (1/1-12/31)	---
12799 (7/10/1991)	Clear Creek	6/16/1930	Bowman-Spaulding conduit	5 (10/1 - 9/30)	---
	Fall Creek			10 (12/1-7/31)	---
	Trap Creek			5 (1/1-7/31)	---
12800 (7/10/1991)	Clear Creek	6/16/1930	Bowman-Spaulding conduit	5 (4/15-9/30)	---
	Fall Creek			10 (4/15-7/31)	---
	Trap Creek			5 (4/15-7/31)	---

Table 3-88. NID's water rights associated with the Yuba-Bear Hydroelectric Project. (Source: NID, 2011a)

License, Permit, Application, or Statement No.	Source	Priority Date	Place of Storage or Diversion	Direct Diversion Amount (cfs)	Storage Amount (acre-feet)
12802 (7/10/1991)	Texas Creek	11/27/1934	Bowman-Spaulding conduit	68 (1/1-6/30)	---
	Clear Creek			13.6 (1/1-7/31)	---
	Fall Creek			75.7 (12/1-7/31)	---
	Trap Creek			8.6 (4/15-6/30)	---
	Rucker Creek			25 (1/1-12/31)	---
12803 (7/10/1991)	Wilson Creek	11/27/1934	Milton-Bowman conduit	3.5 (1/1-12/31)	---
			Bowman reservoir	---	680 (11/1-6/30)
12801 (7/10/1991)	Wilson Creek	11/27/1934	Milton-Bowman conduit and Bowman Lake	2.7 (1/1-12/31)	680 (11/1-6/30)
Permit No. 5815 (Lic. In Progress)	Clear Creek	11/27/1934	Bowman-Spaulding conduit	30 (1/1-12/31)	6,000 (1/1-6/30)
	Texas Creek			70 (1/1-12/31)	14,000 (11/1-6/30)
	Fall Creek			85 (1/1-12/31)	17,000 (11/1-6/30)
	Trap Creek			15 (1/1-12/31)	3,000 (11/1-6/30)
	Rucker Creek			25 (1/1-12/31)	5,000 (11/1-6/30)
10016 (3/5/1973)	South Yuba River	9/3/1953	PG&E's Lake Spaulding	200 (9/1-6/30)	---
Permit No. 13772 (Lic. In Progress)	South Yuba River	3/6/1961	Rollins reservoir	200 (9/1-6/30)	18,000 (11/1-6/30)

Table 3-88. NID's water rights associated with the Yuba-Bear Hydroelectric Project. (Source: NID, 2011a)

License, Permit, Application, or Statement No.	Source	Priority Date	Place of Storage or Diversion	Direct Diversion Amount (cfs)	Storage Amount (acre-feet)
Permit No. 13773 (Lic. In Progress)	Middle Yuba River	4/6/1961	Jackson Meadows and Bowman reservoirs	---	50,000 (10/1-6/30)
9903 (4/19/1972)	Bear River	2/5/1963	Chicago Park flume	1,056 (1/1-12/31)	---
9902 (4/19/1972)	Bear River	2/5/1963	Dutch Flat no. 2 flume	550 (1/1-12/31)	---
S1 0591 (Riparian Right)	Damfine Spring	1967	Jackson Meadows campground	---	---
S1 0592 (Riparian Right)	Unnamed tributary to Pass Creek	1967	Jackson Meadows Campground	---	---
Permit No. 16953 (Lic. In Progress)	Bear River	1/9/1976	Rollins reservoir	700 (1/1-12/31)	62,080 (11/30-6/1)
Permit No. 19158 (Lic. In Progress)	Canyon Creek	10/22/1982	Bowman reservoir	322 (1/1-12/31)	65,000 (1/1-7/31)

Table 3-89. Summary of water rights held by PG&E related to the Drum-Spaulling Project. (Source: PG&E, 2011a)

Applica- tion No.	License or (Permit) No.	Statement of Water Diversion and Use No.	Priority/ First use	Storage Right (acre- feet)	Direct Diversion Right		Description (Name of Works)	Point of Diversion	Type of Use ^a	Water Right Class
					Amount	Units				
		934	1855	207			Upper Rock Lake	Rock Creek	P,I,D,PS	Pre-1914
		935	1855	48			Lower Rock Lake	Rock Creek	P,I,D,PS	Pre-1914
		936	1852	953			Culbertson Lake	Texas Creek	P,I,D,PS	Pre-1914
		937	1870	18			Upper Lindsey Lake	Lindsey Creek	P,I,D,PS	Pre-1914
		938		110			Middle Lindsey Lake	Lindsey Creek	P,I,D,PS	Pre-1914
		939	1870	293			Lower Lindsey Lake	Lindsey Creek	P,I,D,PS	Pre-1914
		940	1875	739			Feeley Lake	Lake Creek	P,I,D,PS	Pre-1914
		941	1875	150			Carr Lake	Lake Creek	P,I,D,PS	Pre-1914
		9978	1870		20	cfs	Texas Creek feeder	Texas Creek	P,I,J,M,D	Pre-1914
		9979	1870		20	cfs	Lindsey Creek feeder	Lindsey Creek	P,I,J,M,D	Pre-1914
		9980	1870		20	cfs	Clear Creek feeder	Clear Creek	P,I,J,M,D	Pre-1914
		9981	1870		30	cfs	Fall Creek feeder	Fall Creek	P,I,J,M,D	Pre-1914
		10396	1870		30	cfs	Trap Creek diversion	Trap Creek	P	Pre-1914
		942	1870	1163			Blue Lake	Rucker Creek	P,I,D,PS	Pre-1914
		943	1870	648			Rucker Lake	Rucker Creek	P,I,D,PS	Pre-1914
		9982	1870		30	cfs	Rucker Creek feeder	Rucker Creek	P,I,J,M,D	Pre-1914

Table 3-89. Summary of water rights held by PG&E related to the Drum-Spaulding Project. (Source: PG&E, 2011a)

Applica- tion No.	License or (Permit) No.	Statement of Water Diversion and Use No.	Priority/ First use	Storage Right (acre- feet)	Direct Diversion Right		Description (Name of Works)	Point of Diversion	Type of Use ^a	Water Right Class
					Amount	Units				
		9032	1870		70	cfs	Jordan Creek conduit	Jordan Creek	P,I,D,PS	Pre-1914
		945	1864	4935			Meadow Lake	Tributary to Fordyce Creek	P,I,D,PS	Pre-1914
		946	1850	570			White Rock reservoir	White Rock Creek	P,I,D,PS	Pre-1914
		951	1877	1764			Sterling Lake	Sterling Creek	P,I,D,PS	Pre-1914
		9033	1873	20,222			Lake Fordyce near Cisco	Fordyce Creek	P,I,J,M,D	Pre-1914
2750	986		2/9/1 922	26,572			Lake Fordyce	Fordyce Creek	P	License
3550	10867		7/26/1 923	26,662			Lake Fordyce	Fordyce Creek	I,M,J	License
		948	1855	1,505			Kidd Lake	Tributary to South Yuba River	P,I,D,PS	Pre-1914
		949	1855	1,736			Upper Peak Lake	Tributary to South Yuba River	P,I,D,PS	Pre-1914
		950	1860	484			Lower Peak Lake	Tributary to South Yuba River	P,I,D,PS	Pre-1914
		944	1852	74,773			Lake Spaulding	South Yuba River	P,I,D,PS	Pre-1914
		954	1853		165	cfs	South Yuba canal	South Yuba River	P,I,D	Pre-1914

Table 3-89. Summary of water rights held by PG&E related to the Drum-Spaulding Project. (Source: PG&E, 2011a)

Applica- tion No.	License or (Permit) No.	Statement of Water Diversion and Use No.	Priority/ First use	Storage Right (acre- feet)	Direct Diversion Right		Description (Name of Works)	Point of Diversion	Type of Use ^a	Water Right Class
					Amount	Units				
		965	1853		10	cfs	So. Yuba canal feeders sta. 40+08 to 55+83	Tributary to Bear River	P,I	Pre-1914
		970	1853		10	cfs	South Yuba canal feeder - sta. 63 7+20	Tributary to Bear River	P,I	Pre-1914
		953	1865		800	cfs	Drum canal intake	South Yuba River	P,I,D,PS	Pre-1914
4851	1464		9466	300			Kelly Lake	Six Mile Valley	I,D	License
		952	1887	7964			Lake Valley reservoir	Lake Valley Creek	P,I,D,PS	Pre-1914
26517	(P20253)		9/4/1 980		42	cfs	Lake Valley canal	North Fork of the North Fork American River	P	Permit
		955	1853		40	cfs	Lake Valley canal	North Fork of the North Fork American River	P,I,D	Pre-1914
		964	1865		10	cfs	Feeder to Drum canal	Tributary to Bear River	P	Pre-1914
5970	8888		7/5/1928		525	cfs	Dutch Flat 1 intake	Bear River	P	License
2753	987		2/9/1922		100	cfs	Bear River canal intake	Bear River	P	License

Table 3-89. Summary of water rights held by PG&E related to the Drum-Spaulding Project. (Source: PG&E, 2011a)

Applica- tion No.	License or (Permit) No.	Statement of Water Diversion and Use No.	Priority/ First use	Storage Right (acre- feet)	Direct Diversion Right		Description (Name of Works)	Point of Diversion	Type of Use ^a	Water Right Class
					Amount	Units				
6332	1375		6/19/1929		120	cfs	Bear River canal intake	Bear River	P	License
		957	1852		475	cfs	Bear River canal intake	Bear River	P,I,D,PS	Pre-1914
		969	1917		---	cfs	Inflow to Halsey afterbay	Dry Creek	P,I,D	Prescription
		968	1917		---	cfs	Inflow to Rock Creek reservoir	Rock tributary to Bear Creek	P,I,D	Prescription
		960	1863		50	cfs	Towle canal 500 ft below head	Canyon Creek	P,I,D,PS	Pre-1914
		961	1864		60	cfs	Boardman canal below Alta powerhouse	Little Bear River	I,D	Pre-1914

^a Domestic (D); Irrigation (I); Municipal (M); Power (P); Public Service (PS).

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
BACTERIA (MUNICIPAL, RECREATION-1)			
Total coliform	< 10,000 MPN per 100 mL < 240 MPN per 100 mL (geometric mean)	U.S. EPA, 2003	Water contact recreation, single day sample; water contact recreation, 30-day geometric mean
Fecal coliform	< 10% of sample > 400 MPN per 100 mL < 200 MPN per 100 mL (geometric mean)	Central Valley Water Board, 1998	Water contact recreation, 30-day geometric mean with individual samples not >400 MPN/100 mL
<i>Escherichia coli</i>	< 235 MPN per 100 mL in any single sample < 126 MPN per 100 mL (geometric mean)	U.S. EPA, 2003	Water contact recreation, 30-day geometric mean
BIOSTIMULATORY SUBSTANCES (COLDWATER HABITAT, SPAWNING)			
Nitrate-Nitrite	---	---	---
Total Kjeldahl Nitrogen	---	---	---
Total Phosphorous	---	---	---
CHEMICAL CONSTITUENTS (AGRICULTURE, COLDWATER HABITAT, MUNICIPAL)			
Alkalinity	None	---	---
Aluminum	1 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Arsenic	0.05 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Cadmium	0.005 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Calcium	None	---	---

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
Chloride	250 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Chromium	50 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Specific Conductance	150 μ Siemens/cm	Central Valley Water Board, 1998	Aquatic Life Protection
Copper	1 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Iron	0.3 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Mercury	0.002 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Nickel	100 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Potassium	None	---	---
Selenium	0.05 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Silver	0.1 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Sodium	None	---	---

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
Zinc	5 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
DISSOLVED OXYGEN (COLDWATER HABITAT, SPAWNING)			
Dissolved Oxygen	> 7 mg/L (minimum) > 75% saturation in 95% of samples > 85% saturation in 50% of samples	Central Valley Water Board, 1998	Aquatic Life Protection
FLOATING MATERIAL (RECREATION-1, RECREATION-2)			
Floating material	Narrative criteria	Central Valley Water Board, 1998	Aesthetics—absent by visual observation
OIL AND GREASE (RECREATION-1, RECREATION-2)			
Oil and Grease	Narrative	Central Valley Water Board, 1998	Aesthetics—absent by visual observation
Total Petroleum Hydrocarbons	None	---	---
pH (COLDWATER HABITAT, SPAWNING, WILDLIFE)			
pH	6.5-8.5	Central Valley Water Board, 1998	Aquatic Life Protection
SEDIMENT AND SETTLEABLE SOLIDS (RECREATION-2, SPAWNING, WILDLIFE)			
Sediment	Narrative	Central Valley Water Board, 1998	Aquatic Life Protection

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
TASTES AND ODORS (MUNICIPAL)			
Chloride	250 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Specific Conductance	900 µSiemens/cm	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Copper	1.3 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Iron	0.3 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Silver	0.1 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
Sodium	30-60 mg/L	U.S. EPA, 2003	Sodium Restricted Diet
Zinc	5 mg/L	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a
TOXICITY (COLDWATER HABITAT, SPAWNING, MUNICIPAL)			
Ammonia as N (pH and temperature dependent) ^b	24.1 mg/L (CMC); 4.2-5.9 mg/L (CCC) 5.6 mg/L (CMC); 1.7-2.4 mg/L (CCC) 0.9 mg/L (CMC); 0.3-0.5 mg/L (CCC)	U.S. EPA, 2000	CTR criteria over 0-20°C assuming pH 7.0 CTR criteria over 0-20°C assuming pH 8.0 CTR criteria over 0-20°C assuming pH 9.0
Aluminum	0.087 mg/L	Marshack, 2003	Ambient Water Quality Criteria; see footnotes in Marshack, 2003

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
Arsenic	0.34 mg/L (CMC); 0.15 mg/L (CCC)	U.S. EPA, 2000	CTR criteria
Cadmium (hardness dependent)	0.16 µg/L (CMC); 0.24 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	0.35 µg/L (CMC); 0.41 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	0.54 µg/L (CMC); 0.55 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	0.95 µg/L (CMC); 0.80 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃
Copper	0.80 µg/L (CMC); 0.69 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	1.54 µg/L (CMC); 1.25 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	2.25 µg/L (CMC); 1.77 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	3.64 µg/L (CMC); 2.74 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃
Mercury	0.05 µg/L	U.S. EPA, 2000 40 CFR 131.38	CTR/Federal Register 5/18/2000

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
Chromium (hardness dependent)	47.19 µg/L (CMC); 15.31 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	83.25 µg/L (CMC); 27.00 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	116.03 µg/L (CMC); 37.64 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	176.31 µg/L (CMC); 57.19 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃
Iron	1 mg/L	Marshack, 2003	Ambient Water Quality Criteria
Nitrate-Nitrite	10 mg/L (combined total)	CDHS, 2005, as cited in Central Valley Water Board, 1998	Title 22 Primary MCL ^a ("Blue Baby Syndrome")
Nickel (hardness dependent)	37.21 µg/L (CMC); 4.14 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	66.89 µg/L (CMC); 7.44 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	94.26 µg/L (CMC); 10.46 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	145.21 µg/L (CMC); 16.14 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
Silver (hardness dependent)	0.02 µg/L (CMC) instantaneous	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	0.07 µg/L (CMC) instantaneous		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	0.13 µg/L (CMC) instantaneous		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	0.32 µg/L (CMC) instantaneous		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃
Lead (hardness dependent)	2.0 µg/L (CMC); 0.086 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	5.0 µg/L (CMC); 0.191 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	8.0 µg/L (CMC); 0.303 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	14.0 µg/L (CMC); 0.540 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃
Zinc (hardness dependent)	9.26 µg/L (CMC); 9.33 µg/L (CCC)	U.S. EPA, 2000	CTR for dissolved sample assuming hardness of 5 mg/L as CaCO ₃
	16.66 µg/L (CMC); 16.79 µg/L (CCC)		CTR for dissolved sample assuming hardness of 10 mg/L as CaCO ₃
	23.48 µg/L (CMC); 23.68 µg/L (CCC)		CTR for dissolved sample assuming hardness of 15 mg/L as CaCO ₃
	36.20 µg/L (CMC); 36.50 µg/L (CCC)		CTR for dissolved sample assuming hardness of 25 mg/L as CaCO ₃

Table 3-90. Water quality objectives supporting designated uses in the project areas. (Source: PG&E and NID, 2010a)

Parameter	Basin Plan Objective, California Toxics Rule Criterion, or Benchmark	Reference	Notes
TEMPERATURE (COLDWATER HABITAT, SPAWNING, WILDLIFE)			
Temperature	20°C (mean daily), > 3-5°C (min)	Elliot 1981; Frost and Brown 1967	See PG&E and NID, 2010b
TURBIDITY (COLDWATER HABITAT, SPAWNING, WILDLIFE)			
Turbidity	Increase < 1 NTU for 1-5 NTU background; Increase < 20% for 5-50 NTU background	Central Valley Water Board, 1998	Aesthetics, disinfection, egg incubation

¹CDHS Title 22 identified as minimum water quality thresholds, but acknowledged as insufficiently protective in some cases (Central Valley Water Board, 1998)

²CTR values listed generally assume dissolved concentrations; values must be adjusted for parameter dependent factors

Key: ---	not available or not applicable
AGRICULTURE	agricultural supply
°C	degrees Celsius
CaCO ₃	calcium carbonate
CCC	Criterion Continuous Concentration (4-day chronic exposure) for aquatic toxicity as defined by EPA (2000)
CMC	Criterion Maximum Concentration (1-hour acute exposure) for aquatic toxicity as defined by EPA (2000)
COLDWATER HABITAT	cold freshwater habitat
CTR	California Toxics Rule
MCL	maximum contaminant level
mg/L	milligrams per liter
mL	milliliter
MPN	most probable number
MUNICIPAL	municipal and domestic supply
NTU	nephelometric turbidity units
RECREATION-1	water contact recreation
RECREATION-2	water non-contact recreation
SPAWNING	spawning, reproduction, and/or early development
WARM	warm freshwater habitat
WILDLIFE	wildlife habitat
µSiemens/cm	micro-Siemens per centimeter
µg/L	micrograms per liter

Table 3-91. Fishes in the Drum-Spaulding and Yuba-Bear Project area. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Scientific Name	Status ^a	Sacramento-San Joaquin Drainage ^b
Threadfin shad	<i>Dorosoma petenense</i>	--	Introduced
Cutthroat trout	<i>Oncorhynchus clarki</i>	--	Native
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	FT	Introduced
Rainbow trout	<i>Oncorhynchus mykiss</i>	--	Native
Steelhead trout	<i>Oncorhynchus mykiss</i>	--	Native
Kokanee	<i>Oncorhynchus nerka</i>	--	Introduced
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	--	Native
Mountain whitefish	<i>Prosopium williamsoni</i>	--	Native
Brown trout	<i>Salmo trutta</i>	--	Introduced
Brook trout	<i>Salvelinus fontinalis</i>	--	Introduced
Lake trout	<i>Salvelinus namaycush</i>	--	Introduced
Pond smelt	<i>Hypomesus olidus</i>	--	Introduced
Common carp	<i>Cyprinus carpio</i>	--	Introduced
Tui chub	<i>Gila bicolor</i>	--	Native
Sacramento hitch	<i>Lavinia exilicauda exilicauda</i>	--	Native
California roach	<i>Lavinia symmetricus</i>	--	Native
Hardhead	<i>Mylopharodon conocephalus</i>	CSC	Native
Golden shiner	<i>Notemigonus crysoleucas</i>	--	Introduced
Sacramento pikeminnow	<i>Ptychocheilus grandis</i>	--	Native
Speckled dace	<i>Rhinichthys osculus</i>	--	Native
Lahontan redbreast	<i>Richardsonius egregius</i>	--	Native
Sacramento sucker	<i>Catostomus occidentalis</i>	--	Native
White catfish	<i>Ameiurus catus</i>	--	Introduced
Brown bullhead	<i>Ameiurus nebulosus</i>	--	Introduced
Channel catfish	<i>Ictalurus punctatus</i>	--	Introduced
Mosquitofish	<i>Gambusia affinis</i>	--	Introduced
Green sunfish	<i>Lepomis cyanellus</i>	--	Introduced
Pumpkinseed	<i>Lepomis gibbosus</i>	--	Introduced
Bluegill	<i>Lepomis macrochirus</i>	--	Introduced
Redear sunfish	<i>Lepomis microlophus</i>	--	Introduced

Table 3-91. Fishes in the Drum-Spaulding and Yuba-Bear Project area. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Scientific Name	Status ^a	Sacramento-San Joaquin Drainage ^b
Smallmouth bass	<i>Micropterus dolomieu</i>	--	Introduced
Largemouth bass	<i>Micropterus salmoides</i>	--	Introduced
Crappie	<i>Pomoxis</i> sp.	--	Introduced
Sculpin spp.	<i>Cottus</i> sp.	--	

^a Status: FT – Federally Threatened; CSC – California Fish and Wildlife species of concern.

^b Native or introduced into the Sacramento-San Joaquin Drainage Basin.

Table 3-92. Fish species present in Drum-Spaulding Project reservoirs reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Upper Rock Lake	Lower Rock Lake	Culbertson Lake	Upper Lindsay Lake	Middle Lindsay Lake	Lower Lindsay Lake	Feeley Lake	Carr Lake	Blue Lake	Rucker Lake	Fuller Lake	Meadow Lake	White Rock Lake	Lake Sterling	Fordyce Lake	Kidd Lake	Upper Peak Lake	Lower Peak Lake	Lake Spaulding	Deer Creek Forebay	Drum Forebay	Drum Afterbay	Halsey Forebay	Halsey Afterbay	Rock Creek Reservoir	Wise Forebay	Lake Valley Reservoir	Kelly Lake	Alta Forebay
Rainbow trout	●	●	●	●	●	●	●	●	●	●	●	●	■	●	◉	●	●	●	◉	●	●	●	●	●	●		●	●	●
Brown trout										▲					◉				◉										
Brook trout	■	■		●		●	●	▲		●	●	●		●	◉	●			◉	●	●	●	●	●	●		●		●
Cutthroat trout	●	●	●	●	●	●	●	●			●	●	●	●	◉	●	●	●		●		●		●			●	●	
Mountain whitefish									▲										■										
Kokanee				▲								●	▲	▲		■	▲	▲											
Chinook salmon											●								◉							●			
Arctic grayling																					●					●			
Lake trout				▲											●				●										
Common carp																				●	●	●							
Sacramento pikeminnow						●													◉							●	●		
Tui chub															◉														
Lahontan redbside				●	●	●									●				○					●			●		
Speckled dace										●						●									●			●	
Golden shiner										●											●				●				
Sacramento sucker										●									○										
Largemouth bass																								●					

Table 3-92. Fish species present in Drum-Spaulling Project reservoirs reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Upper Rock Lake	Lower Rock Lake	Culbertson Lake	Upper Lindsay Lake	Middle Lindsay Lake	Lower Lindsay Lake	Feeley Lake	Carr Lake	Blue Lake	Rucker Lake	Fuller Lake	Meadow Lake	White Rock Lake	Lake Sterling	Fordyce Lake	Kidd Lake	Upper Peak Lake	Lower Peak Lake	Lake Spaulding	Deer Creek Forebay	Drum Forebay	Drum Afterbay	Halsey Forebay	Halsey Afterbay	Rock Creek Reservoir	Wise Forebay	Lake Valley Reservoir	Kelly Lake	Alta Forebay
Smallmouth bass										●									○			●		●			●	●	
Crappie										●															●		●	●	
Redear sunfish	●	●		●	●	●	●	●	●	●		●	■			●					●	●			●		●	●	
Green sunfish																					■				●				
Bluegill																				●	●	●	●	●	●				■
Pond smelt																			⊙										

Reference: ● historical, ○ relicensing studies, ⊙ historical and relicensing studies, ■ current status is uncertain, ▲ historically present but likely extirpated

Note: No historical information on fish populations is available for Wise forebay.

Table 3-93. Fish species present in Yuba-Bear Project reservoirs reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Jackson Meadows Reservoir	Milton Diversion Impoundment	Jackson Lake	French Lake	Faucherie Lake	Sawmill Lake	Bowman Lake	Dutch Flat Forebay	Dutch Flat Afterbay	Chicago Park Forebay	Rollins Reservoir
Rainbow trout	◉	●	●	●	●	●	◉				◉
Brown trout	◉	●					◉				◉
Brook trout	◉	●		●	●	●					
Cutthroat trout	◉				●	●					
Kokanee		●					◉				●
Arctic grayling	▲										
Lake trout						▲					
Common carp											●
Sacramento pikeminnow											○
Tui chub	◉	●	●	●	●	●					●
Lahontan redbreast	◉	●			●		◉				
Speckled dace	◉						○				●
Golden shiner							●				◉
Sacramento sucker											○
Largemouth bass											◉
Crappie											◉
Redear sunfish		●				●					◉
Green sunfish							●				◉
Bluegill											◉
Brown bullhead	●										◉

Table 3-93. Fish species present in Yuba-Bear Project reservoirs reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010c)

Common Name	Jackson Meadows Reservoir	Milton Diversion Impoundment	Jackson Lake	French Lake	Faucherie Lake	Sawmill Lake	Bowman Lake	Dutch Flat Forebay	Dutch Flat Afterbay	Chicago Park Forebay	Rollins Reservoir
Channel catfish											◉
White catfish											○
Threadfin shad											●
Pond smelt											◉

Reference: ● historical, ○ relicensing studies, ◉ historical and relicensing studies, ▲ historically present but likely extirpated.

Note: No historical information on fish populations is available for Dutch flat forebay, Dutch flat afterbay, and Chicago Park forebay.

Table 3-94. Fish planted in Drum-Spaulding and Yuba-Bear Project reservoirs from 2002-2009.
(Source: staff, based on specifications provided in PG&E and NID, 2010c)

Reservoir	Rainbow trout	Brown trout	Brook trout	Eagle Lake rainbow trout	Kokanee	Chinook salmon
Jackson Meadow Reservoir	•	•	•	•		
French Lake	•					
Faucherie Lake	•	•		•		
Sawmill Lake	•					
Bowman Lake	•			•	•	
Rollins Reservoir	•	•			•	
Upper Rock	•					
Lower Rock Lake	•					
Culbertson Lake	•					
Upper Lindsey Lake	•					
Lower Lindsey Lake	•	•				
Halsey Forebay	•			•		
Lake Valley Reservoir	•			•		•
Fuller Lake	•	•		•		
Fordyce Lake	•					
Lake Spaulding						•

Table 3-95. Number and composition of fish captured in the Drum-Spaulding and Yuba-Bear Project reservoirs, June to November 2009. (Source: NID and PGE, 2010a)

Species	Jackson Meadow Reservoir		Bowman Lake		Rollins Reservoir		Lake Spaulding		Fordyce Lake	
	N	%	N	%	N	%	N	%	N	%
Lahontan cutthroat trout	2	0.2							1	2.0
Rainbow trout	92	7.4	16	2.9	1	0.2	10	3.0	17	34.7
Kokanee			23	4.1						
Chinook salmon							6	1.8		
Brown trout	37	3.0	123	22.2	54	9.2	32	9.8	16	32.7
Brook trout	6	0.5					1	0.3	2	4.1
Pond smelt					31	5.3	69	21.0		
Tui chub	1	0.1							13	26.5
Golden shiner					3	0.5				
Sacramento pikeminnow					52	8.8	192	58.5		
Speckled dace	60	4.8	51	9.2						
Lahontan redbreast	1,050	84.1	342	61.6			9	2.7		
Sacramento sucker					6	1.0	1	0.3		
White catfish					6	1.0				
Brown bullhead					2	0.3				
Channel catfish					20	3.4				
Green sunfish					6	1.0				
Bluegill					114	19.4				
Redear sunfish					2	0.3				
Smallmouth bass					264	44.8	7	2.1		
Largemouth bass					24	4.1				
Black Crappie					1	0.2				
Centrarchid sp.					3	0.5				
Unidentified species	1	0.1					1	0.3		
Total (number captured)	1,249		555		589		328		49	

Table 3-96. Fish species present in the Drum-Spaulding and Yuba-Bear Projects stream reaches reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010d)

	Middle Yuba River Sub-basin			Deer Creek Sub-basin	Canyon Creek Sub-basin						Texas Creek Sub-basin							Fall Creek Sub-basin					Rucker Creek Sub-basin				
Common Name	Jackson Meadows Dam Reach	Milton Diversion Dam Reach	Wilson Creek Diversion Reach	Deer Creek Powerhouse Reach	Jackson Lake Dam Reach	French Lake Dam Reach	Faucherie Lake Dam Reach	Sawmill Lake Dam Reach	Bowman-Spaulding Diversion Dam Reach	Canyon Creek below Texas Creek Confluence Reach	Upper Rock Lake Dam Reach	Lower Rock Lake Dam Reach #1 and #2	Texas Creek Diversion Dam Reach	Culbertson Lake Dam Reach	Upper Lindsey Lake Dam Reach	Middle Lindsey Lake Dam Reach	Lower Lindsey Lake Dam Reach	Clear Creek Diversion Reach	Feeley Lake Dam Reach	Carr Lake Dam Reach #1	Carr Lake Dam Reach #2	Fall Creek Diversion Dam Reach	Trap Creek Diversion Reach	Blue Lake Dam Reach	Rucker Lake Dam Reach	Rucker Creek Diversion Reach	
Rainbow trout	○	●		■	●	○	●	●	○	■	○	●	▲	●	▲	●	●	●	▲	●	●	●	●	●	▲	●	▲
Brook trout	▲	●			○	▲	▲	▲		■	▲	●	▲	●	▲	▲	▲	●	●	●	●	●	●				
Brown trout	○	●		■	●	▲	○	●	○	■		●	▲		▲		●	○		●	●	●	▲		●	▲	
Cutthroat trout	▲	▲																									
Lahontan Cutthroat		■																									
Steelhead																											
Chinook salmon																											
Sculpin spp.																											
Sucker spp.																											
Sacramento sucker		●		●																							
Sacramento pikeminnow		●																									
California Roach																											
Lahontan Redside	○																										
Golden shiner																●				●							
Speckled Dace																											
Hardhead		●																									
Mosquitofish																											
Hitch																											
Channel Catfish																											
Brown Bullhead																											
Largemouth bass		▲																								▲	
Smallmouth bass		●																								▲	
Green sunfish																										●	
Pumpkinseed Sunfish																											
Bluegill																											

Reference: ● indicates historical, ○ indicates relicensing studies, ● indicates historical and relicensing studies, ■ indicates current status is uncertain, and ▲ indicates historically present but likely extirpated

Note: No historical information on fish populations is available for Wise forebay.

Table 3-96. Fish species present in the Drum-Spaulling and Yuba-Bear Projects stream reaches reported during historical and relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010d)

	South Yuba River Sub-basin										Bear River Sub-basin						North Fork of the North Fork American River Sub-basin						Mormon Ravine Sub-Basin	Coon Creek Sub-basin	Dry Creek Sub-basin	Auburn Ravine Sub-basin
Common Name	Fuller Lake Dam Reach	Jordan Creek Diversion Reach	Meadow Lake Dam Reach	White Rock Lake Dam Reaches #1 and 2	Lake Sterling Dam Reach	Fordyce Lake Dam Reach	Kidd Lake Dam Reach	Upper South Yuba Reaches #1 and #2	South Yuba River Below Spaulding No. 2 Powerhouse Reach	South Yuba Reaches #1 through #6	Bear River Reach #1 and #2	Drum Afterbay Dam Reach	Dutch Flat Afterbay Dam Reach	Chicago Park Powerhouse Reach	Bear River Canal Diversion Dam Reach	Alta Powerhouse Reach	Lake Valley Reservoir Dam Reach	Lake Valley Canal Diversion Dam Reach	Kelly Lake Dam Reach	Canyon Creek Above Towle Canal Diversion Dam Reach	Towle Canal Diversion Dam Reach	Mormon Ravine Reach	Rock Creek Dam Reach	Halsey Afterbay Dam Reach	Wise Powerhouse Overflow Reach	
Rainbow trout	●	●	▲	●	▲	●	▲	▲	○	●	●	●	○		●	▲	●	●	▲	○		○	○	▲	●	
Brook trout	▲	▲	▲	●	○	▲	▲	▲	▲	▲	▲	▲	○				▲	▲	▲					▲		
Brown trout	▲	▲	▲		▲	●	▲	○	○	○	●	○	○	○	●	▲	●	●			○		▲	○	●	
Cutthroat trout			▲																							
Lahontan Cutthroat																										
Steelhead																										
Chinook salmon																						○			●	
Sculpin spp.						●																				
Sucker spp.																										
Sacramento sucker								○		●				○	○		○								●	
Sacramento pikeminnow		▲							▲	●		▲		○	○	▲									●	
California Roach					○												○								●	
Lahontan Redside						○		○																	●	
Golden shiner															▲									○	●	
Speckled Dace								○					○	○											○	
Hardhead										●															●	
Mosquitofish																							○	○	●	
Hitch																									●	
Channel Catfish															●		●	●					▲		▲	
Brown Bullhead								○																		
Largemouth bass							▲								▲	▲							●		●	
Smallmouth bass										○				○	▲	▲							▲		▲	
Green sunfish										●		▲		○	○		●	●	○					○	●	
Pumpkinseed Sunfish																							○		●	
Bluegill																								○	●	
Reference: ● indicates historical, ○ indicates relicensing studies, ● indicates historical and relicensing studies, ■ indicates current status is uncertain, and ▲ indicates historically present but likely extirpated																										
Note: No historical information on fish populations is available for Wise forebay.																										

Reference: ● indicates historical, ○ indicates relicensing studies, ● indicates historical and relicensing studies, ■ indicates current status is uncertain, and ▲ indicates historically present but likely extirpated

Note: No historical information on fish populations is available for Wise forebay.

Table 3-97. Characterization of aquatic macroinvertebrate community biological condition in sampled reaches of Yuba-Bear and Drum-Spaulding Projects during relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010e)

Sub-basin	Study Reach	MMI Score	MMI Condition Category	IBI Score	IBI Condition Category
North Yuba River	North Yuba reach—upper	62	Fair	66	Fair
	North Yuba reach —lower	74	Good	61	Fair
Middle Yuba River	Milton diversion dam reach—upper	48	Fair	26	Poor
	Milton diversion dam reach—middle	88	Good	84	Good
	Milton diversion dam reach—lower	68	Good	56	Fair
Canyon Creek	Bowman-Spaulding diversion dam reach	64	Fair	61	Fair
	Canyon Creek below Texas Creek confluence reach	68	Good	50	Fair
Texas Creek	Lower Rock Lake dam reach	62	Fair	47	Fair
	Texas Creek diversion dam reach	54	Fair	53	Fair
South Yuba River	Upper South Yuba River reach no. 2	66	Fair	44	Fair
	South Yuba below Spaulding no. 2 powerhouse	68	Good	76	Good
	South Yuba River reach no. 1	22	Poor	17	Poor
	South Yuba River reach no. 5	58	Fair	44	Fair
	South Yuba River reach no. 6	56	Fair	40	Fair
Fordyce Creek	Fordyce Lake dam reach	44	Fair	50	Fair
Bear River	Bear River reach no. 1	84	Good	74	Good
	Bear River reach no. 2	80	Good	60	Fair

Table 3-97. Characterization of aquatic macroinvertebrate community biological condition in sampled reaches of Yuba-Bear and Drum-Spaulding Projects during relicensing studies. (Source: staff, based on specifications provided in PG&E and NID, 2010e)

Sub-basin	Study Reach	MMI Score	MMI Condition Category	IBI Score	IBI Condition Category
North Fork of the North Fork American River	Drum afterbay dam reach	70	Good	67	Good
	Dutch Flat afterbay dam reach	46	Fair	43	Fair
	Bear River canal diversion dam reach—upper	26	Poor	36	Fair
	Bear River canal diversion dam reach—lower	50	Fair	51	Fair
	Lake Valley reservoir dam reach	58	Fair	50	Fair
	Lake Valley canal diversion dam reach	62	Fair	54	Fair
	Auburn Ravine	32	Poor	33	Fair
	Rock Creek	36	Fair	34	Fair
Dry Creek	Halsey afterbay dam reach	24	Poor	21	Poor

Appendix A-2

Aquatic Resources Tables: Environmental Effects

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Table 3-98. Water year types for the Drum-Spaulding and Yuba-Bear Projects. (Source: adapted by staff, from PG&E 2011a; NID 2011a)

Water Year Type	DWR Forecast of Total Unimpaired Runoff in the Yuba River at Smartville in Thousand Acre-Feet or DWR Full Natural Flow Near Smartville for the Water Year in Thousand Acre-Feet¹
Extreme Critically Dry	Equal to or Less than 615
Critically Dry	616 to 900
Dry	901 to 1,460
Below Normal	1,461 to 2,190
Above Normal	2,191 to 3,240
Wet	Greater than 3,240

¹ DWR rounds the Bulletin 120 forecast to the nearest 1,000 acre-feet. The Full Natural Flow is provided to the nearest acre-foot, and Licensee will round DWR's Full Natural Flow to the nearest 1,000 acre-feet.

Table 3-99. Determination of water year type proposed by Reclamation for setting minimum streamflows in Mormon Ravine upstream of Folsom Lake. (Source: adapted by staff, from BOR, 2012)

Period/Exceedance	Unregulated Index/Forecast	Minimum Flow Schedule
January 1 Sacramento River Unregulated Index at 75 Percent Exceedance (million acre-feet)	Between 12.5 and 10.2	Dry Year Schedule
	Between 10.2 and 8.1	Critical Year Schedule
	Less than 8.1	Extreme Critical Year Schedule
Yuba April to July Unregulated Forecast at 90 Percent Exceedance (thousand acre-feet)	Between 800 and 525	Dry Year Schedule
	Between 525 and 300	Critical Year Schedule
	Below 300	Extreme Critical Year Schedule

Table 3-100. Required releases to the Middle Yuba River, South Yuba River, Canyon Creek, Fall Creek, Rucker Creek, and Bear River under the existing license. (Source: adapted by staff, from PG&E and NID, 2011a)

Sub-Basin	Reservoir	Development	Gage Location (USGS/PG&E No.)	Date	Required Minimum Flow (cfs)	Water Year Type
Canyon Creek	Upper Rock Lake	Spaulding No. 3	Downstream of Upper Rock Lake	7/1 to 9/30	0.1	All ^a
	Lower Rock Lake	Spaulding No. 3	Downstream of Lower Rock Lake (11416610/YB-202)	7/1 to 9/30	0.1	All ^a
	Culbertson Lake	Spaulding No. 3	Downstream of Culbertson Lake (11416620/YB-203)	Year-Round	0.3	All ^a
	Middle Lindsey Lake	Spaulding No. 3	Downstream of Middle Lindsey Lake	7/1 to 9/30	0.1	All ^a
	Lower Lindsey Lake	Spaulding No. 3	Downstream of Lower Lindsey Lake	Year-Round	0.2	All ^a
Fall Creek	Feeley Lake	Spaulding No. 3	Downstream of Feeley Lake (11414350/YB-207)	Year-Round	0.2	All ^a
	Carr Lake	Spaulding No. 3	Downstream of Carr Lake (11414360/YB-208)	Year-Round	0.2	All ^a
Rucker Creek	Blue Lake	Spaulding No. 3	No Gage	Year Round	0.2	All ^a
	Rucker Lake	Spaulding No. 3	No Gage	Year Round	0.2	All ^a
South Yuba River	Fordyce Lake	Spaulding No. 1 and No. 2	Downstream of Fordyce Lake	Year-Round ^b	5	All
	Lake Spaulding	Spaulding No. 1 and No. 2	No Gage (At or adjacent to Spaulding Powerhouse No. 2)	Year-Round	1	All

Table 3-100. Required releases to the Middle Yuba River, South Yuba River, Canyon Creek, Fall Creek, Rucker Creek, and Bear River under the existing license. (Source: adapted by staff, from PG&E and NID, 2011a)

Sub-Basin	Reservoir	Development	Gage Location (USGS/PG&E No.)	Date	Required Minimum Flow (cfs)	Water Year Type
	Lake Spaulding	Spaulding No. 1 and No. 2	No Gage (Downstream of Spaulding Powerhouse No. 2 at Langs Crossing)	Year-Round	5	All
Bear River	Drum Forebay	Drum No. 1 and No. 2	Towle Canal Diversion Dam (11426196/YB-282)	Year-Round	1 ^d	All
	Drum Afterbay	Dutch Flat No. 1	Downstream of Drum Afterbay (11421770/YB-44)	3/1 to 9/30	10	Normal
				10/1 to 2/28-29	5	Normal
					5	Dry ^c
Mormon Ravine	Newcastle Powerhouse Header Box	Newcastle	Mormon Ravine (11425418/YB-292)	Year-round	5	All

^a During dry years, these flows shall be adjusted according to the following formula between July 1 and October 31:

$(0.80 * (\text{storage}_{\text{July 1}}) * 0.504) / (123)$, where 0.80 is used to account for evaporation in the lake; 0.504 is the conversion from acre-feet to cfs; and 123 is the number of days from July 1 through October 31.

^b Year-round provided that sufficient lake storage shall be reserved at the time of outlet adjustment for unattended winter operation to insure an initial flow of 5 cfs and not less than 3 cfs at lake level maximum winter drawdown.

^c Dry year conditions are deemed to exist in the month following whenever the accumulated seasonal precipitation at Lake Spaulding commencing with October 1, is equal to or less than: 29 inches as of January 31; 35 inches as of February 28-29; 40 inches as of March 31; 45 inches as of April 30, provided that if total precipitation by April 30 is 45 inches or less. Dry year conditions are deemed to exist for the remainder of the year.

^d The required minimum flow is 1 cfs or natural streamflow, whichever is less.

^e Upper Boardman Canal was taken out of service by the April 11, 1994, amendment to the license.

Table 3-101. Average wetted perimeter and depth at the respective channel flow response transects downstream of Drum-Spaulding Project facilities where minimum streamflows are proposed, based on PG&E's proposed minimum streamflows, as amended, with buffer flows. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Minimum streamflow	Transect 1		Transect 2		Transect 3	
	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)
Little Bear River Below Alta Powerhouse Tailrace						
0.5 cfs (0.75 cfs with buffer)	7.84	0.27	7.46	0.28	6.75	0.61
1 cfs (1.25 cfs with buffer)	8.25	0.34	7.74	0.35	7.56	0.61
2 cfs (2.25 cfs with buffer)	8.72	0.43	8.18	0.42	8.07	0.67
3 cfs (3.25 cfs with buffer)	9.21	0.48	8.54	0.47	8.33	0.72
4 cfs (4.25 cfs with buffer)	10.12	0.49	8.83	0.51	8.65	0.75
Rock Creek Below Rock Creek Dam						
1 cfs (1.25 cfs with buffer)	4.87	0.31	11.3	0.89	9.47	0.43
2 cfs (2.25 cfs with buffer)	6.28	0.34	11.55	0.97	10.47	0.52
3 cfs (3.25 cfs with buffer)	8.45	0.32	11.69	1.02	10.75	0.59
Dry Creek Below Halsey Afterbay						
1 cfs (1.25 cfs with buffer)	7.41	0.5	6.09	0.14	10.63	1.16

Table 3-101. Average wetted perimeter and depth at the respective channel flow response transects downstream of Drum-Spaulding Project facilities where minimum streamflows are proposed, based on PG&E's proposed minimum streamflows, as amended, with buffer flows. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Minimum streamflow	Transect 1		Transect 2		Transect 3	
	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)
Texas Creek Below Lower rocker Lake #1						
0.1 cfs	1.72	0.11	2.40	0.12	1.45	0.04
0.25 cfs	4.30	0.27	6.01	0.31	3.63	0.10
Texas Creek Below Lower Rock Lake #2						
0.1 cfs	1.58	0.05	1.38	0.03	1.40	0.12
0.25 cfs	3.94	0.13	3.44	0.07	3.49	0.29
Unnamed Tributary Below Culbertson Lake						
0.3 cfs	4.73	0.28	5.14	0.38	5.37	0.11
0.75 cfs	6.36	0.43	6.75	0.55	7.22	0.19
1 cfs	6.61	0.45	7.21	0.56	7.44	0.21
1.5 cfs	7.75	0.46	7.38	0.62	7.62	0.28
Lindsey Creek Below Middle Lindsey Lake						
0.1 cfs	2.19	0.06	3.39	0.35	3.06	0.10
0.2 cfs	4.38	0.11	6.77	0.70	6.12	0.20
Lindsey Creek Below Lower Lindsey Lake						
0.2 cfs	6.06	0.49	5.01	0.09	4.37	0.15
0.5 cfs	12.60	1.04	10.71	0.21	9.48	0.31
0.7 cfs	12.98	1.09	11.50	0.24	10.33	0.34
Lake Creek Below Carr Lake Dam (Reach #1)						
0.2 cfs	5.70	0.21	4.55	0.17	7.68	0.66
0.5 cfs	7.75	0.30	6.65	0.26	9.13	0.80
1 cfs	8.25	0.40	7.00	0.38	9.30	0.85
Lake Creek Below Carr Lake Dam (Reach #2)						
0.2 cfs	4.87	0.05	7.36	0.27	10.92	0.52
0.5 cfs	8.29	0.11	10.85	0.34	14.14	0.64
1 cfs	9.78	0.18	13.46	0.37	15.68	0.65

Table 3-101. Average wetted perimeter and depth at the respective channel flow response transects downstream of Drum-Spaulding Project facilities where minimum streamflows are proposed, based on PG&E's proposed minimum streamflows, as amended, with buffer flows. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Minimum streamflow	Transect 1		Transect 2		Transect 3	
	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)
Rucker Creek Below Blue Lake Dam						
0.2 cfs	11.60	0.72	6.25	0.18	4.34	0.17
0.3 cfs	14.02	0.88	7.54	0.24	5.70	0.21
0.5 cfs	14.28	0.93	7.65	0.28	7.54	0.24
Rucker Creek Below Lake Dam						
0.2 cfs	7.93	0.17	10.16	0.22	12.59	0.77
0.5 cfs	10.04	0.24	12.63	0.29	14.27	0.93
0.75 cfs	10.82	0.26	13.30	0.32	14.45	0.97
1 cfs	11.03	0.30	13.76	0.34	14.58	1.00
1.5 cfs	11.20	0.36	14.46	0.37	14.75	1.05
Jordan Creek Below Jordan Creek Diversion Dam						
0.25 cfs	6.66	0.32	6.63	0.16	7.58	0.46
Unnamed Tributary Below Meadow Lake Dam						
1 cfs	16.35	1.15	9.96	0.19	16.71	0.58
5 cfs	19.56	1.19	11.80	0.45	18.74	0.78
11 cfs	21.12	1.31	12.97	0.68	20.60	0.90
White Rock Creek Below White Rock Lake Dam (Reach #1 and #2)						
0.5 cfs	12.41	1.22	8.05	0.4	7.39	0.62
1 cfs	12.52	1.25	8.77	0.48	7.82	0.71
Unnamed Tributary Below Kidd Lake Dam						
0.5 cfs	5.31	0.29	5.12	0.12	4.14	0.16
0.75 cfs	5.39	0.33	5.45	0.15	4.39	0.19
1 cfs	5.46	0.36	5.7	0.18	5.06	0.19

Table 3-101. Average wetted perimeter and depth at the respective channel flow response transects downstream of Drum-Spaulding Project facilities where minimum streamflows are proposed, based on PG&E's proposed minimum streamflows, as amended, with buffer flows. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Minimum streamflow	Transect 1		Transect 2		Transect 3	
	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)	Wetted Perimeter (ft)	Average Depth (ft)
Cascade Creek Below Lower Peak Lake Dam						
0.5 cfs	3.96	0.15	3.72	0.05	4	0.26
0.75 cfs	5.94	0.22	5.58	0.08	6	0.39
1 cfs	7.92	0.29	7.44	0.11	8	0.53
Sixmile Creek Below Kelly Lake Dam						
0.2 cfs	3.22	0.09	12.36	0.9	7.95	0.39
0.5 cfs	4.79	0.14	12.58	0.97	9.11	0.45

Table 3-102. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Texas Creek below Upper Rock Lake dam (Compliance Point: YB-201) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.1	0.1	0.25	0.25	0.25	0.25
November	0.1	0.1	0.25	0.25	0.25	0.25
December	0.1	0.1	0.25	0.25	0.25	0.25
January	0.1	0.1	0.25	0.25	0.25	0.25
February	0.1	0.1	0.25	0.25	0.25	0.25
March	0.1	0.1	0.25	0.25	0.25	0.25
April	0.1	0.1	0.25	0.25	0.25	0.25
May	0.1	0.1	0.25	0.25	0.25	0.25
June	0.1	0.1	0.25	0.25	0.25	0.25
July	0.1	0.1	0.25	0.25	0.25	0.25
August	0.1	0.1	0.25	0.25	0.25	0.25
September	0.1	0.1	0.25	0.25	0.25	0.25

Table 3-103. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Texas Creek below Lower Rock Lake dam (Compliance Point: YB-202) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.1	0.1	0.25	0.25	0.25	0.25
November	0.1	0.1	0.25	0.25	0.25	0.25
December	0.1	0.1	0.25	0.25	0.25	0.25
January	0.1	0.1	0.25	0.25	0.25	0.25
February	0.1	0.1	0.25	0.25	0.25	0.25
March	0.1	0.1	0.25	0.25	0.25	0.25
April	0.1	0.1	0.25	0.25	0.25	0.25
May	0.1	0.1	0.25	0.25	0.25	0.25
June	0.1	0.1	0.25	0.25	0.25	0.25
July	0.1	0.1	0.25	0.25	0.25	0.25
August	0.1	0.1	0.25	0.25	0.25	0.25
September	0.1	0.1	0.25	0.25	0.25	0.25

Table 3-104. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – unnamed tributary – below Culbertson Lake dam (Compliance Point: YB-203) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.3	0.3	0.75	0.75	1.5	1.5
November	0.3	0.3	0.75	0.75	1	1
December	0.3	0.3	0.75	0.75	1	1
January	0.3	0.3	0.75	0.75	1	1
February	0.3	0.3	0.75	0.75	1	1
March	0.3	0.3	0.75	0.75	1	1
April	0.3	0.3	0.75	0.75	1	1
May	0.3	0.3	0.75	0.75	1	1
June	0.3	0.3	0.75	0.75	1.5	1.5
July	0.3	0.3	0.75	0.75	1.5	1.5
August	0.3	0.3	0.75	0.75	1.5	1.5
September	0.3	0.3	0.75	0.75	1.5	1.5

Table 3-105. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Lindsey Creek below Middle Lindsey Lake dam (Compliance Point: YB 205) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.1	0.1	0.1	0.2	0.2	0.2
November	0.1	0.1	0.1	0.2	0.2	0.2
December	0.1	0.1	0.1	0.2	0.2	0.2
January	0.1	0.1	0.1	0.2	0.2	0.2
February	0.1	0.1	0.1	0.2	0.2	0.2
March	0.1	0.1	0.1	0.2	0.2	0.2
April	0.1	0.1	0.1	0.2	0.2	0.2
May	0.1	0.1	0.1	0.2	0.2	0.2
June	0.1	0.1	0.1	0.2	0.2	0.2
July	0.1	0.1	0.1	0.2	0.2	0.2
August	0.1	0.1	0.1	0.2	0.2	0.2
September	0.1	0.1	0.1	0.2	0.2	0.2

Table 3-106. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Lindsey Creek below Lower Lindsey Lake dam (Compliance Point: YB 206B) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.5	0.7	0.7	0.7
November	0.2	0.2	0.5	0.7	0.7	0.7
December	0.2	0.2	0.5	0.7	0.7	0.7
January	0.2	0.2	0.5	0.7	0.7	0.7
February	0.2	0.2	0.5	0.7	0.7	0.7
March	0.2	0.2	0.5	0.7	0.7	0.7
April	0.2	0.2	0.5	0.7	0.7	0.7
May	0.2	0.2	0.5	0.7	0.7	0.7
June	0.2	0.2	0.5	0.7	0.7	0.7
July	0.2	0.2	0.5	0.7	0.7	0.7
August	0.2	0.2	0.5	0.7	0.7	0.7
September	0.2	0.2	0.5	0.7	0.7	0.7

Table 3-107. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Lake Creek below Feeley Lake dam (Compliance Point: YB-207) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.5	1	1	1
November	0.2	0.2	0.5	1	1	1
December	0.2	0.2	0.5	1	1	1
January	0.2	0.2	0.5	1	1	1
February	0.2	0.2	0.5	1	1	1
March	0.2	0.2	0.5	1	1	1
April	0.2	0.2	0.5	1	1	1
May	0.2	0.2	0.5	1	1	1
June	0.2	0.2	0.5	1	1	1
July	0.2	0.2	0.5	1	1	1
August	0.2	0.2	0.5	1	1	1
September	0.2	0.2	0.5	1	1	1

Table 3-108. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Lake Creek below Carr Lake dam (Compliance Point: YB-208) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.5	1	1	1
November	0.2	0.2	0.5	1	1	1
December	0.2	0.2	0.5	1	1	1
January	0.2	0.2	0.5	1	1	1
February	0.2	0.2	0.5	1	1	1
March	0.2	0.2	0.5	1	1	1
April	0.2	0.2	0.5	1	1	1
May	0.2	0.2	0.5	1	1	1
June	0.2	0.2	0.5	1	1	1
July	0.2	0.2	0.5	1	1	1
August	0.2	0.2	0.5	1	1	1
September	0.2	0.2	0.5	1	1	1

Table 3-109. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Rucker Creek below Blue Lake dam (Compliance Point: YB-209) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.3	0.5	0.5	0.5
November	0.2	0.2	0.3	0.5	0.5	0.5
December	0.2	0.2	0.3	0.5	0.5	0.5
January	0.2	0.2	0.3	0.5	0.5	0.5
February	0.2	0.2	0.3	0.5	0.5	0.5
March	0.2	0.2	0.3	0.5	0.5	0.5
April	0.2	0.2	0.3	0.5	0.5	0.5
May	0.2	0.2	0.3	0.5	0.5	0.5
June	0.2	0.2	0.3	0.5	0.5	0.5
July	0.2	0.2	0.3	0.5	0.5	0.5
August	0.2	0.2	0.3	0.5	0.5	0.5
September	0.2	0.2	0.3	0.5	0.5	0.5

Table 3-110. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Rucker Creek below Rucker Lake dam (Compliance Point: YB-210) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.5	0.75	1	1.5
November	0.2	0.2	0.5	0.75	1	1.5
December	0.2	0.2	0.5	0.75	1	1.5
January	0.2	0.2	0.5	0.75	1	1.5
February	0.2	0.2	0.5	0.75	1	1.5
March	0.2	0.2	0.5	0.75	1	1.5
April	0.2	0.2	0.5	0.75	1	1.5
May	0.2	0.2	0.5	0.75	1	1.5
June	0.2	0.2	0.5	0.75	1	1.5
July	0.2	0.2	0.5	0.75	1	1.5
August	0.2	0.2	0.5	0.75	1	1.5
September	0.2	0.2	0.5	0.75	1	1.5

Table 3-111. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – unnamed tributary below Fuller Lake dam (Compliance Point: YB-211) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.25	0.25	0.25	0.25	0.25	0.25
November	0.25	0.25	0.25	0.25	0.25	0.25
December	0.25	0.25	0.25	0.25	0.25	0.25
January	0.25	0.25	0.25	0.25	0.25	0.25
February	0.25	0.25	0.25	0.25	0.25	0.25
March	0.25	0.25	0.25	0.25	0.25	0.25
April	0.25	0.25	0.25	0.25	0.25	0.25
May	0.25	0.25	0.25	0.25	0.25	0.25
June	0.25	0.25	0.25	0.25	0.25	0.25
July	0.25	0.25	0.25	0.25	0.25	0.25
August	0.25	0.25	0.25	0.25	0.25	0.25
September	0.25	0.25	0.25	0.25	0.25	0.25

Table 3-112. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – unnamed tributary below Meadow Lake dam (Compliance Point: YB 217) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	1	1
November	1	1	1	1	1	1
December	1	1	1	1	1	1
January	1	1	1	1	1	1
February	1	1	1	1	1	1
March	1	1	1	1	1	1
April	1	1	1	1	1	1
May	1	1	1	1	1	1
June	1	1	1	1	1	1
July 1-8	5	5	5	5	5	5
July 9-17	11	11	11	11	11	11
July 18-31	5	5	5	5	5	5
August	1	1	1	1	1	1
September	1	1	1	1	1	1

Table 3-113. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – White Rock Creek below White Rock diversion dam (Compliance Point: YB-218) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	0.5	0.5	0.5	1	1
November	0.5	0.5	0.5	0.5	1	1
December	0.5	0.5	0.5	0.5	1	1
January	0.5	0.5	0.5	0.5	1	1
February	0.5	0.5	0.5	0.5	1	1
March	0.5	0.5	0.5	0.5	1	1
April	0.5	0.5	0.5	0.5	1	1
May	0.5	0.5	0.5	0.5	1	1
June	0.5	0.5	0.5	0.5	1	1
July	0.5	0.5	0.5	0.5	1	1
August	0.5	0.5	0.5	0.5	1	1
September	0.5	0.5	0.5	0.5	1	1

Table 3-114. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Bloody Creek below Lake Sterling dam (Compliance Point: low level outlet works at Lake Sterling dam) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	0.5	0.5	0.5	1	1.5
November	0.5	0.5	0.5	0.5	1	1
December	0.5	0.5	0.5	0.5	1	1
January	0.5	0.5	0.5	0.5	1	1
February	0.5	0.5	0.5	0.5	1	1
March	0.5	0.5	0.5	0.5	1	1
April	0.5	0.5	0.5	0.5	1	1
May	0.5	0.5	0.5	0.5	1	1
June	0.5	0.5	0.5	0.5	1	1.5
July	0.5	0.5	0.5	0.5	1	1.5
August	0.5	0.5	0.5	0.5	1	1.5
September	0.5	0.5	0.5	0.5	1	1.5

Table 3-115. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Fordyce Creek below Fordyce Lake Dam (Compliance Point: YB-200) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	20	20	20	25	25	25
November	15	15	15	20	25	25
December	15	15	15	20	25	25
January	15	15	15	20	25	25
February	15	15	15	20	25	25
March	15	15	15	20	25	25
April	15	15	15	20	25	25
May	40	40	40	40	45	45
June	30	30	30	30	45	45
July	25	25	25	25	30	30
August	20	20	20	25	25	25
September	20	20	20	25	25	25

Table 3-116. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Fordyce Creek below Fordyce Lake dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	78%	78%	78%	85%	85%	85%
November	69%	69%	69%	78%	85%	85%
December	69%	69%	69%	78%	85%	85%
January	69%	69%	69%	78%	85%	85%
February	69%	69%	69%	78%	85%	85%
March	69%	69%	69%	78%	85%	85%
April	69%	69%	69%	78%	85%	85%
May	96%	96%	96%	96%	97%	97%
June	90%	90%	90%	90%	97%	97%
July	85%	85%	85%	85%	90%	90%
August	78%	78%	78%	85%	85%	85%
September	78%	78%	78%	85%	85%	85%
JUVENILE RAINBOW TROUT^b						
October	95%	95%	95%	98%	98%	98%
November	87%	87%	87%	95%	98%	98%
December	87%	87%	87%	95%	98%	98%
January	87%	87%	87%	95%	98%	98%
February	87%	87%	87%	95%	98%	98%
March	87%	87%	87%	95%	98%	98%
April	87%	87%	87%	95%	98%	98%
98%May	99%	99%	99%	99%	98%	98%
June	100%	100%	100%	100%	98%	98%
July	98%	98%	98%	98%	100%	100%
August	95%	95%	95%	98%	98%	98%
September	95%	95%	95%	98%	98%	98%

Table 3-116. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Fordyce Creek below Fordyce Lake dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	66%	66%	66%	79%	88%	88%
May	100%	100%	100%	100%	100%	100%
June	94%	94%	94%	94%	100%	100%

^a The maximum habitat for adult rainbow trout (14,235 square feet WUA per 1,000 linear feet of stream) occurs at 70 cfs (figure 6.3.1-20 on page E6.3- 40 of the final license application).

^b The maximum habitat for juvenile rainbow trout (15,969 square feet WUA per 1,000 linear feet of stream) occurs at 35 cfs figure 6.3.1-20 on page E6.3-40 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (4,203 square feet WUA per 1,000 linear feet of stream) occurs at 45 cfs (figure 6.3.1-20 on page E6.3-40 of the final license application).

Table 3-117. Reductions in average summertime reservoir elevations in Fordyce Lake under PG&E's minimum streamflows, as amended (with buffer flows) as compared to conditions under the existing license. Fordyce Lake's normal maximum surface water elevation is 6,405.1 feet.^a (Source: HEC-ResSim Water Balance/Operations Model in PG&E's Supplement No. 2)

Water Year Type	Median Reservoir Water Surface Elevation (ft)						
	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Sep 30
NO-ACTION ALTERNATIVE (Elevation)							
Critically Dry & Extreme Critically Dry	6,377.6	6,374.3	6,359.3	6,349.2	6,335.4	6,322.8	6,321.8
Dry	6,395.2	6,388.8	6,369.4	6,360.4	6,348.4	6,338.8	6,338.5
Below Normal	6,404.4	6,393.8	6,374.4	6,365.8	6,354.4	6,345.8	6,346.5
Above Normal	6,404.7	6,398.8	6,379.4	6,371.2	6,360.5	6,353.5	6,353.0
Wet	6,405.1	6,403.9	6,386.5	6,378.8	6,368.7	6,362.7	6,353.0
PG&E's AMENDED MINIMUM STREAMFLOWS (Elevation)							
Critically Dry & Extreme Critically Dry	6,361.0	6,355.4	6,347.7	6,341.3	6,334.5	6,328.0	6,324.9
Dry	6,368.2	6,362.7	6,355.5	6,349.4	6,342.9	6,335.1	6,332.7
Below Normal	6,382.7	6,371.0	6,364.4	6,358.7	6,352.9	6,346.2	6,338.9
Above Normal	6,395.2	6,392.9	6,376.2	6,369.4	6,364.3	6,358.4	6,353.3
Wet	6,404.9	6,396.3	6,380.8	6,371.6	6,366.4	6,360.7	6,356.6
PG&E's AMENDED MINIMUM STREAMFLOWS (Change in Elevation from No-Action Alternative)							
Critically Dry & Extreme Critically Dry	-16.6	-18.9	-11.6	-7.9	-0.9	5.2	3.1
Dry	-27.0	-26.1	-13.9	-11.0	-5.5	-3.7	-5.8
Below Normal	-21.7	-22.8	-10.0	-7.1	-1.5	0.3	-7.7

Table 3-118. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – unnamed tributary below Kidd Lake dam (Compliance Point: YB-220) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	0.5	0.5	0.5	0.5	0.5
November	0.5	0.5	0.5	0.5	0.5	0.5
December	0.5	0.5	0.5	0.5	0.5	0.5
January	0.5	0.5	0.5	0.5	0.5	0.5
February	0.5	0.5	0.5	0.5	0.5	0.5
March	0.5	0.5	0.5	0.5	0.5	0.5
April	0.5	0.5	0.5	0.5	0.5	0.5
May	0.5	0.5	0.5	0.5	0.5	0.5
June	0.5	0.5	0.5	0.75	1	1
July	0.5	0.5	0.5	0.5	0.5	0.5
August	0.5	0.5	0.5	0.5	0.5	0.5
September	0.5	0.5	0.5	0.5	0.5	0.5

Table 3-119. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Cascade Creek below Lower Peak Lake dam (Compliance Point: YB-222) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	0.5	0.5	0.5	0.5	0.5
November	0.5	0.5	0.5	0.5	0.5	0.5
December	0.5	0.5	0.5	0.5	0.5	0.5
January	0.5	0.5	0.5	0.5	0.5	0.5
February	0.5	0.5	0.5	0.5	0.5	0.5
March	0.5	0.5	0.5	0.5	0.5	0.5
April	0.5	0.5	0.5	0.5	0.5	0.5
May	0.5	0.5	0.5	0.5	0.5	0.5
June	0.5	0.5	0.5	0.75	1	1
July	0.5	0.5	0.5	0.5	0.5	0.5
August	0.5	0.5	0.5	0.5	0.5	0.5
September	0.5	0.5	0.5	0.5	0.5	0.5

Table 3-120. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – South Yuba River below the confluence of unnamed tributary below Kidd Lake and Cascade Creek (Compliance Point: YB-316) under measure DS-AQR1, Part 2.
(Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	5	5	5	5
November	5	5	5	5	5	5
December	5	5	5	5	5	5
January	5	5	5	5	5	5
February	5	5	5	5	5	5
March	5	5	5	5	5	5
April	5	5	5	5	5	5
May	5	5	5	5	5	5
June	5	5	5	5	5	5
July	5	5	5	5	5	5
August	5	5	5	5	5	5
September	5	5	5	5	5	5

Table 3-121. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – South Yuba River below Lake Spaulding dam (Compliance Point: YB 29) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	10/20*	20	20	25	25	30
November	10/20*	20	20	25	25	30
December	10/20*	20	20	25	25	30
January	10/20*	20	20	25	25	30
February	10/20*	25	25	35	40	50
March	10/20*	25	30	40	55	75
April	10/20*	30	40	60	80	90
May	10/20*	40	60	90	90	90
June	10/20*	35	40	50	90	90
July	10/20*	25	30	35	40	40
August	10/20*	20	23	25	40	40
September 1-15	10/20*	20	23	25	40	40
September 16-30	10/20*	20	20	25	28	30

Table 3-122. NMFS' proposal for release or spill from Lake Spaulding dam; flows sufficient to achieve continuous minimum flows (in cubic feet per second) in the South Yuba River, measured at USGS Gage 1 14142 10.^a (Source: NMFS, July 31, 2012)

Jan	Feb	Mar	Apr	May^b	Jun^b	Jul^c	Aug^c	Sep^c	Oct^c	Nov^c	Dec^c
25	25	25	25	75	75	50	50	50	50	50	50

^a The above flow conditions are to be met in all water year types, based on the California Department of Water Resources' water year forecast of unimpaired year-round runoff in the Yuba River at Smartville, as set forth in the Department's "Bulletin 120 Water Year Conditions in California." An exception is that in extreme cases, water supplies may not be available to meet the flow requirements above; when the May Bulletin 120 forecasts year-round unimpaired runoff in the Yuba River at Smartville below 615,000 acre-feet, the licensees should conference with FERC (as the lead), NMFS, USACE, and the other entities and agencies implementing (prospective) spring-run Chinook salmon and/or steelhead reintroduction, and this contingency should be evaluated under NMFS' recommended condition for adaptive management, described below.

^b Flows in May and June were designed to aid Spring-run Chinook volitional migration from Englebright reservoir to the primary holding reaches above the confluence with Poorman Creek, at approximately RM 28. If it is determined that the preferred method of reintroduction involves transport of the fish by truck to the holding reaches, the flows should be lowered to the values below:

- 25 and 50 cfs for May and June respectively, downstream of Spaulding dam, measured at USGS Gage 11414210.
- 15 and 30 cfs for May and June respectively, downstream of Bowman Dam, measured at USGS Gage 11416500.

^c Additional flows July-Dec may be required to maintain suitable water temperatures for holding and spawning/incubation downstream to the Poorman Creek Confluence, at approximately RM 28. NMFS recommends the funding, installation, operation and maintenance of telemetered water temperature and flow gages at this location; the installation of gages, their rating, and the determination of flows and temperatures should occur under the supervision of, or in cooperation with, the United States Geological Survey.

July 1- September 15: From Bowman and Spaulding dams, release or spill the greater of:

The flows sufficient to maintain water temperatures in the South Yuba River above the confluence with Poorman Creek (RM 28) below 19°C, measured as the running average of the previous 7 days' daily average water temperature, or the flows to maintain a minimum instantaneous flow of 50 cfs in the South Yuba River (measured at USGS Gage 11414210 below Spaulding dam) and a minimum instantaneous flow of 30 cfs in Canyon Creek (measured at USGS Gage 11416500 below Bowman dam).

Table 3-123. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the South Yuba River below Jordan Creek and below Canyon Creek that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	40%	40%	40%	48%	48%	55%
November	40%	40%	40%	48%	48%	55%
December	40%	40%	40%	48%	48%	55%
January	40%	40%	40%	48%	48%	55%
February	40%	48%	48%	61%	67%	76%
March	40%	48%	55%	67%	79%	89%
April	40%	55%	67%	82%	91%	94%
May	40%	67%	82%	94%	94%	94%
June	40%	61%	67%	76%	94%	94%
July	40%	48%	55%	61%	67%	67%
August	40%	40%	45%	48%	67%	67%
September 1-15	40%	40%	45%	48%	67%	67%
September 16-30	40%	40%	40%	48%	52%	55%
JUVENILE RAINBOW TROUT^b						
October	90%	90%	90%	95%	95%	98%
November	90%	90%	90%	95%	95%	98%
December	90%	90%	90%	95%	95%	98%
January	90%	90%	90%	95%	95%	98%
February	90%	95%	95%	99%	100%	99%
March	90%	95%	98%	100%	99%	95%
April	90%	98%	100%	98%	93%	91%
May	90%	100%	98%	91%	91%	91%
June	90%	99%	100%	99%	91%	91%
July	90%	95%	98%	99%	100%	100%

Table 3-123. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the South Yuba River below Jordan Creek and below Canyon Creek that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
August	90%	90%	93%	95%	100%	100%
September 1-15	90%	90%	93%	95%	100%	100%
September 16-30	90%	90%	90%	95%	96%	98%
SPAWNING RAINBOW TROUT^c						
April	53%	64%	71%	81%	85%	86%
May	53%	71%	81%	86%	86%	86%
June	53%	67%	71%	77%	86%	86%

^a The maximum habitat for adult rainbow trout (20,367 square feet WUA per 1,000 linear feet of stream) occurs at 150 cfs (figure 6.3.1-21 on page E6.3-41 of the final license application).

^b The maximum habitat for juvenile rainbow trout (23,660 square feet WUA per 1,000 linear feet of stream) occurs at 40 cfs (figure 6.3.1-21 on page E6.3-41 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (6.5 13 square feet WUA per 1,000 linear feet of stream) occurs at 300 cfs (figure 6.3.1-21 on page E6.3-41 of the final license application).

Table 3-124. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 2D Site on the South Yuba River upstream of Canyon Creek that corresponds to PG&E's proposed minimum streamflows, as amended (without buffer flows). (Source: adapted by staff from Technical Memorandum 3-7, *Special-Status Amphibians - Foothill Yellow-Legged Frog Habitat Model*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	98%	91%	85%	74%	74%	74%
June	98%	93%	91%	88%	74%	74%
TADPOLES						
July	93%	91%	90%	88%	86%	86%
August	93%	93%	92%	91%	86%	86%
September 1-15	93%	93%	92%	91%	86%	86%
September 16-30	93%	93%	93%	91%	90%	90%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August, and September.

Table 3-125. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – South Fork Deer Creek below Deer Creek powerhouse (Compliance Point YB-34 in South Yuba Canal) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	5	5	5	5
November	5	5	5	5	5	5
December	5	5	5	5	5	5
January	5	5	5	5	5	5
February	5	5	5	5	5	5
March	5	5	5	5	5	5
April	5	5	5	5	5	5
May	5	5	5	5	5	5
June	5	5	5	5	5	5
July	5	5	5	5	5	5
August	5	5	5	5	5	5
September	5	5	5	5	5	5

Table 3-126. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – North Fork of the North Fork American River below Lake Valley Reservoir dam (Compliance Point: YB-104) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	2	2	3	3	3	4
November	2	2	3	3	3	4
December	2	2	3	3	3	4
January	2	2	3	3	3	4
February	2	2	3	3	3	4
March	2	2	3	3	3	4
April	2	4	4	6	8	10
May	2	6	6	9	11	15
June	2	5	5	6	8	10
July	2	3	3.5	5	5.5	6
August	2	3	3.5	5	5.5	6
September	2	3	3.5	5	5.5	6

Table 3-127. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Lake Valley Reservoir dam reach of the North Fork of the North Fork American River that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	64%	64%	74%	74%	74%	84%
November	64%	64%	74%	74%	74%	84%
December	64%	64%	74%	74%	74%	84%
January	64%	64%	74%	74%	74%	84%
February	64%	64%	74%	74%	74%	84%
March	64%	64%	74%	74%	74%	84%
April	64%	84%	84%	94%	99%	100%
May	64%	94%	94%	99%	100%	97%
June	64%	89%	89%	94%	99%	100%
July	64%	74%	79%	89%	91%	94%
August	64%	74%	79%	89%	91%	94%
September	64%	74%	79%	89%	91%	94%
JUVENILE RAINBOW TROUT^b						
October	79%	79%	87%	87%	87%	95%
November	79%	79%	87%	87%	87%	95%
December	79%	79%	87%	87%	87%	95%
January	79%	79%	87%	87%	87%	95%
February	79%	79%	87%	87%	87%	95%
March	79%	79%	87%	87%	87%	95%
April	79%	95%	95%	100%	100%	98%
May	79%	100%	100%	99%	97%	90%
June	79%	97%	97%	100%	100%	98%
July	79%	87%	91%	97%	98%	100%
August	79%	87%	91%	97%	98%	100%
September	79%	87%	91%	97%	98%	100%

Table 3-127. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Lake Valley Reservoir dam reach of the North Fork of the North Fork American River that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	23%	41%	41%	57%	70%	80%
May	23%	57%	57%	75%	84%	95%
June	23%	41%	41%	57%	70%	80%

^a The maximum habitat for adult rainbow trout (8,600 square feet WUA per 1,000 linear feet of stream) occurs at 10 cfs (figure 6.3.1-27 on page E6.3- 44 of the final license application).

^b The maximum habitat for juvenile rainbow trout (8,773 square feet WUA per 1,000 linear feet of stream) occurs at 8 cfs (figure 6.3.1-27 on page E6.3- 44 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (5,632 square feet WUA per 1,000 linear feet of stream) occurs at 25 cfs (figure 6.3.1-27 on page E6.3-44 of the final license application).

Table 3-128. Flow setting streamflows proposed by PG&E for Drum-Spaulding Project – Sixmile Creek below Kelly Lake dam (Compliance Point: YB-226) under measure DS-AQR1, Part 3. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.2	0.2	0.2	0.5	0.5	0.5
November	0.2	0.2	0.2	0.5	0.5	0.5
December	0.2	0.2	0.2	0.5	0.5	0.5
January	0.2	0.2	0.2	0.5	0.5	0.5
February	0.2	0.2	0.2	0.5	0.5	0.5
March	0.2	0.2	0.2	0.5	0.5	0.5
April	0.2	0.2	0.2	0.5	0.5	0.5
May	0.2	0.2	0.2	0.5	0.5	0.5
June	0.2	0.2	0.2	0.5	0.5	0.5
July	0.2	0.2	0.2	0.5	0.5	0.5
August	0.2	0.2	0.2	0.5	0.5	0.5
September	0.2	0.2	0.2	0.5	0.5	0.5

Table 3-129. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – North Fork of the North Fork American River below Lake Valley canal diversion dam (Compliance Point: YB-236) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	2.2	2.2	3.2	3.5	3.5	4.5
November	2.2	2.2	3.2	3.5	3.5	4.5
December	2.2	2.2	3.2	3.5	3.5	4.5
January	2.2	2.2	3.2	3.5	3.5	4.5
February	2.2	2.2	3.2	3.5	3.5	4.5
March	2.2	2.2	3.2	3.5	3.5	4.5
April	2.2	4.2	4.2	6.5	8.5	10.5
May	2.2	6.2	6.2	9.5	11.5	15.5
June	2.2	5.2	5.2	6.5	8.5	10.5
July	2.2	3.2	3.7	5.5	6	6.5
August	2.2	3.2	3.7	5.5	6	6.5
September	2.2	3.2	3.7	5.5	6	6.5

Table 3-130. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the North Fork of the North Fork American River below Lake Valley canal diversion dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	28%	28%	32%	33%	33%	37%
November	28%	28%	32%	33%	33%	37%
December	28%	28%	32%	33%	33%	37%
January	28%	28%	32%	33%	33%	37%
February	28%	28%	32%	33%	33%	37%
March	28%	28%	32%	33%	33%	37%
April	28%	36%	36%	44%	49%	53%
May	28%	43%	43%	51%	54%	59%
June	28%	40%	40%	44%	49%	53%
July	28%	32%	34%	41%	42%	44%
August	28%	32%	34%	41%	42%	44%
September	28%	32%	34%	41%	42%	44%
JUVENILE RAINBOW TROUT^b						
October	42%	42%	46%	47%	47%	51%
November	42%	42%	46%	47%	47%	51%
December	42%	42%	46%	47%	47%	51%
January	42%	42%	46%	47%	47%	51%
February	42%	42%	46%	47%	47%	51%
March	42%	42%	46%	47%	47%	51%
April	42%	50%	50%	58%	62%	65%
May	42%	57%	57%	64%	66%	68%
June	42%	54%	54%	58%	62%	65%
July	42%	46%	48%	55%	42%	58%
August	42%	46%	48%	55%	57%	58%
September	42%	46%	48%	55%	57%	58%

Table 3-130. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the North Fork of the North Fork American River below Lake Valley canal diversion dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	22%	36%	36%	49%	58%	66%
May	22%	48%	48%	62%	69%	80%
June	22%	43%	43%	49%	58%	66%

^a The maximum habitat for adult rainbow trout (8,515 square feet WUA per 1,000 linear feet of stream) occurs at 280 cfs (figure 6.3.1-28 on page E6.3- 44 of the final license application).

^b The maximum habitat for juvenile rainbow trout (10882 square feet WUA per 1,000 linear feet of stream) occurs at 280 cfs (figure 6.3.1-28 on page E6.3-44 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (2,093 square feet WUA per 1,000 linear feet of stream) occurs at 70 cfs (figure 6.3.1-28 on page E6.3-44 of the final license application).

Table 3-131. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 2D Site on the North Fork of the North Fork American River below Lake Valley canal diversion dam that corresponds to PG&E's proposed minimum streamflows, as amended. (Source: adapted by staff from Technical Memorandum 3-7, *Special-Status Amphibians - Foothill Yellow-Legged Frog Habitat Model*, NID and PG&E 2010).

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	46%	46%	100%	100%	100%	100%
June	46%	46%	100%	100%	100%	100%
TADPOLES						
July	46%	67%	77%	99%	99%	99%
August	46%	67%	77%	99%	99%	99%
September	46%	67%	77%	99%	99%	99%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August and September.

Table 3-132. Resident trout WUA associated with the minimum streamflow in Bear River below Drum canal spillway gate at gage YB-137 agreed to by PG&E and the relicensing stakeholders. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Life Stage	EC	CD	D	BN	AN	W
Oct	Adult	59%	59%	59%	77%	77%	77%
Nov	Adult	59%	59%	59%	77%	77%	77%
Dec	Adult	59%	59%	59%	77%	77%	77%
Jan	Adult	59%	59%	59%	77%	77%	77%
Feb	Adult	59%	59%	59%	77%	77%	77%
Mar	Adult	59%	59%	59%	77%	77%	77%
Apr	Adult	59%	59%	59%	77%	77%	77%
May	Adult	59%	59%	59%	77%	77%	77%
Jun	Adult	59%	59%	59%	77%	77%	77%
Jul	Adult	59%	59%	59%	77%	77%	77%
Aug	Adult	59%	59%	59%	77%	77%	77%
Sep	Adult	59%	59%	59%	77%	77%	77%

Table 3-133. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198 (Compliance Point: YB-198) under measure DS-AQR1, Part 2.
(Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	5	5	5	5
November	5	5	5	5	5	5
December	5	5	5	5	5	5
January	5	5	5	5	5	5
February	5	5	5	5	5	5
March	5	5	5	5	5	5
April	13	13	13	13	13	13
May	13	13	13	13	13	13
June	13	13	13	13	13	13
July	8	8	8	8	8	8
August	8	8	8	8	8	8
September	8	8	8	8	8	8

Table 3-134. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198, Meadow Sub-reach that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	89%	89%	89%	89%	89%	89%
November	89%	89%	89%	89%	89%	89%
December	89%	89%	89%	89%	89%	89%
January	89%	89%	89%	89%	89%	89%
February	89%	89%	89%	89%	89%	89%
March	89%	89%	89%	89%	89%	89%
April	100%	100%	100%	100%	100%	100%
May	100%	100%	100%	100%	100%	100%
June	100%	100%	100%	100%	100%	100%
July	97%	97%	97%	97%	97%	97%
August	97%	97%	97%	97%	97%	97%
September	97%	97%	97%	97%	97%	97%
JUVENILE RAINBOW TROUT^b						
October	97%	97%	97%	97%	97%	97%
November	97%	97%	97%	97%	97%	97%
December	97%	97%	97%	97%	97%	97%
January	97%	97%	97%	97%	97%	97%
February	97%	97%	97%	97%	97%	97%
March	97%	97%	97%	97%	97%	97%
April	98%	98%	98%	98%	98%	98%
May	98%	98%	98%	98%	98%	98%
June	98%	98%	98%	98%	98%	98%
July	100%	100%	100%	100%	100%	100%
August	100%	100%	100%	100%	100%	100%
September	100%	100%	100%	100%	100%	100%

Table 3-134. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198, Meadow Sub-reach that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	82%	82%	82%	82%	82%	82%
May	82%	82%	82%	82%	82%	82%
June	82%	82%	82%	82%	82%	82%

^a The maximum habitat for adult rainbow trout (11,057 square feet WUA per 1,000 linear feet of stream) occurs at 12.5 cfs (figure 6.3.1-24 on page E6.3-42 of the final license application).

^b The maximum habitat for juvenile rainbow trout (10,155 square feet WUA per 1,000 linear feet of stream) occurs at 8 cfs (figure 6.3.1-24 on page E6.3-42 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (3,974 square feet WUA per 1,000 linear feet of stream) occurs at 25 cfs (figure 6.3.1 -24 on page E6.3-42 of the final license application).

Table 3-135. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198, Boardman Sub-reach that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	85%	85%	85%	85%	85%	85%
November	85%	85%	85%	85%	85%	85%
December	85%	85%	85%	85%	85%	85%
January	85%	85%	85%	85%	85%	85%
February	85%	85%	85%	85%	85%	85%
March	85%	85%	85%	85%	85%	85%
April	100%	100%	100%	100%	100%	100%
May	100%	100%	100%	100%	100%	100%
June	100%	100%	100%	100%	100%	100%
July	95%	95%	95%	95%	95%	95%
August	95%	95%	95%	95%	95%	95%
September	95%	95%	95%	95%	95%	95%
JUVENILE RAINBOW TROUT^b						
October	93%	93%	93%	93%	93%	93%
November	93%	93%	93%	93%	93%	93%
December	93%	93%	93%	93%	93%	93%
January	93%	93%	93%	93%	93%	93%
February	93%	93%	93%	93%	93%	93%
March	93%	93%	93%	93%	93%	93%
April	99%	99%	99%	99%	99%	99%
May	99%	99%	99%	99%	99%	99%
June	99%	99%	99%	99%	99%	99%
July	99%	99%	99%	99%	99%	99%
August	99%	99%	99%	99%	99%	99%
September	99%	99%	99%	99%	99%	99%

Table 3-135. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198, Boardman Sub-reach that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	49%	49%	49%	49%	49%	49%
May	49%	49%	49%	49%	49%	49%
June	49%	49%	49%	49%	49%	49%

^a The maximum habitat for adult rainbow trout (9,861 square feet WUA per 1,000 linear feet of stream) occurs at 15cfs (figure 6.3.1-25 on page E6.3-43 of the final license application).

^b The maximum habitat for juvenile rainbow trout (10,099 square feet WUA per 1,000 linear feet of stream) occurs at 10 cfs (figure 6.3.1-25 on page E6.3-43 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (1,511 square feet WUA per 1,000 linear feet of stream) occurs at 105 cfs (figure 6.3.1-25 on page E6.3-43 of the final license application).

Table 3-136. Minimum streamflows proposed by PG&E for the Drum-Spaulling Project – Canyon Creek below Towle canal diversion dam (Compliance Point: YB-282) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	1	1
November	1	1	1	1	1	1
December	1	1	1	1	1	1
January	1	1	1	1	1	1
February	1	1	1	1	2	2
March	1	2	2	2 or NF*	2 or NF*	3 or NF*
April	1	2	2	2 or NF*	2 or NF*	3 or NF*
May	1	1	1	2	2	3
June	1	1	1	2	2	2
July	1	1	1	1	2	2
August	1	1	1	1	2	2
September	1	1	1	1	2	2

Table 3-137. PG&E's proposed Minimum Streamflows in cfs in Canyon Creek below Towle canal diversion dam, as amended. (Source: developed based on data in Amended Appendix E7; PG&E 2011a, NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	59%	59%	59%	59%	59%	59%
November	59%	59%	59%	59%	59%	59%
December	59%	59%	59%	59%	59%	59%
January	59%	59%	59%	59%	59%	59%
February	59%	59%	59%	59%	76%	76%
March	59%	76%	76%	76%	76%	85%
April	59%	76%	76%	76%	76%	85%
May	59%	59%	59%	76%	76%	85%
June	59%	59%	59%	76%	76%	76%
July	59%	59%	59%	59%	76%	76%
August	59%	59%	59%	59%	76%	76%
September	59%	59%	59%	59%	76%	76%
JUVENILE RAINBOW TROUT^b						
October	73%	73%	73%	73%	73%	73%
November	73%	73%	73%	73%	73%	73%
December	73%	73%	73%	73%	73%	73%
January	73%	73%	73%	73%	73%	73%
February	73%	73%	73%	73%	86%	86%
March	73%	86%	86%	86%	86%	92%
April	73%	86%	86%	86%	86%	92%
May	73%	73%	73%	86%	86%	92%
June	73%	73%	73%	86%	86%	86%
July	73%	73%	73%	73%	86%	86%
August	73%	73%	73%	73%	86%	86%
September	73%	73%	73%	73%	86%	86%

Table 3-137. PG&E's proposed Minimum Streamflows in cfs in Canyon Creek below Towle canal diversion dam, as amended. (Source: developed based on data in Amended Appendix E7; PG&E 2011a, NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	25%	43%	43%	43%	43%	57%
May	25%	25%	25%	43%	43%	57%
June	25%	25%	25%	43%	43%	43%

^a The maximum habitat for adult rainbow trout (3,018 square feet WUA per 1,000 linear feet of stream) occurs at 9 cfs (figure 6.3.1-30 on page E6.3-45 of the final license application).

^b The maximum habitat for juvenile rainbow trout (3,151 square feet WUA per 1,000 linear feet of stream) occurs at 8 cfs (figure 6.3.1-30 on page E6.3- 45 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (1,906 square feet WUA per 1,000 linear feet of stream) occurs at 15 cfs (figure 6.3.1-3 0 on page E6.3-45 of the final license application).

Table 3-138. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 1D Site on Canyon Creek below Towle canal diversion dam that corresponds to PG&E's proposed minimum streamflows, as amended (without buffer flows). (Source: adapted by staff Technical Memorandum 3-7, *Special-Status Amphibians - Foothill Yellow-Legged Frog Habitat Model*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	96%	96%	96%	100%	100%	96%
June	96%	96%	96%	100%	100%	100%
TADPOLES						
July	93%	93%	93%	93%	93%	93%
August	93%	93%	93%	93%	93%	93%
September	93%	93%	93%	93%	93%	93%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August and September.

Table 3-139. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Little Bear River below Alta powerhouse tailrace (Compliance Point: YB-98) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	1	1	1	1	1
November	0.5	1	1	1	1	1
December	0.5	1	1	1	1	1
January	0.5	1	1	1	1	1
February	0.5	1	1	2	3	3
March	0.5	1	2	3	4	4
April	0.5	1	1	2	3	3
May	0.5	1	1	1	2	2
June	0.5	1	1	1	1	1
July	0.5	1	1	1	1	1
August	0.5	1	1	1	1	1
September	0.5	1	1	1	1	1

Table 3-140. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Bear River below Drum afterbay dam (Compliance Point: YB-44) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	10	10	12	13	13	13
November	10	10	12	13	13	13
December	10	10	12	13	13	13
January	10	10	12	13	13	13
February	10	10	12	13	13	13
March	14	14	14	14	14	14
April	16	16	16	16	16	16
May	15	15	16	16	16	16
June	10	10	15	16	16	16
July	10	10	12	14	16	16
August	10	10	12	12	12	15
September	10	10	12	12	12	15

Table 3-141. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River below Drum afterbay dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	73%	73%	79%	81%	81%	81%
November	73%	73%	79%	81%	81%	81%
December	73%	73%	79%	81%	81%	81%
January	73%	73%	79%	81%	81%	81%
February	73%	73%	79%	81%	81%	81%
March	84%	84%	84%	84%	84%	84%
April	87%	87%	87%	87%	87%	87%
May	86%	86%	87%	87%	87%	87%
June	73%	73%	86%	87%	87%	87%
July	73%	73%	79%	84%	87%	87%
August	73%	73%	79%	79%	79%	86%
September	73%	73%	79%	79%	79%	86%
JUVENILE RAINBOW TROUT^b						
October	97%	97%	12/99%	99%	99%	99%
November	97%	97%	99%	99%	99%	99%
December	97%	97%	99%	99%	99%	99%
January	97%	97%	99%	99%	99%	99%
February	97%	97%	99%	99%	99%	99%
March	100%	100%	100%	100%	100%	100%
99%April	99%	99%	99%	99%	99%	99%
May	100%	100%	99%	99%	99%	99%
June	97%	97%	100%	99%	99%	99%
July	97%	97%	99%	100%	99%	99%
August	97%	97%	99%	99%	99%	100%
September	97%	97%	99%	99%	99%	100%

Table 3-141. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River below Drum afterbay dam that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	73%	73%	73%	73%	73%	73%
May	70%	70%	73%	73%	73%	73%
June	54%	54%	70%	73%	73%	73%

^a The maximum habitat for adult rainbow trout (6,513 square feet WUA per 1,000 linear feet of stream) occurs at 35 cfs (figure 6.3.1-26 on page E6.3- 43 of the final license application).

^b The maximum habitat for juvenile rainbow trout (9,428 square feet WUA per 1,000 linear feet of stream) occurs at 15 cfs (figure 6.3.1-26 on page E6.3-43 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (1,857 square feet WUA per 1,000 linear feet of stream) occurs at 60 cfs (figure 6.3.1-26 on page E6.3-43 of the final license application).

Table 3-142. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Dry Creek below Halsey afterbay dam (Compliance Point: YB-62A) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	1	1
November	1	1	1	1	1	1
December	1	1	1	1	1	1
January	1	1	1	1	1	1
February	1	1	1	1	1	1
March	1	1	1	1	1	1
April	1	1	1	1	1	1
May	1	1	1	1	1	1
June	1	1	1	1	1	1
July	1	1	1	1	1	1
August	1	1	1	1	1	1
September	1	1	1	1	1	1

Table 3-143. Minimum streamflows proposed by PG&E for the Drum-Spaulling Project – Rock Creek below Rock Creek reservoir dam (Compliance Point: YB 86) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	2	3
November	1	1	1	1	2	3
December	1	1	1	1	2	3
January	1	1	1	1	2	3
February	1	1	1	1	2	3
March	3	3	3	3	3	3
April	1	1	1	1	2	3
May	1	1	1	1	2	3
June	1	1	1	1	2	3
July	1	1	1	1	2	3
August	1	1	1	1	2	3
September	1	1	1	1	2	3

Table 3-144. Minimum Streamflows in cubic feet per second (cfs) for Auburn Ravine below Wise No. 1 and No. 2 powerhouse release point by month and water year type. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
AUBURN RAVINE (COMPLIANCE POINT(S): As close to South Canal as Reasonably Possible)						
October	2	2	4	4	4	4
November	2	2	4	4	4	4
December	2	2	4	4	4	4
January	2	2	4	4	4	4
February	2	2	4	4	4	4
March	2	4	6	6	13	18
April	2	4	6	6	13	18
May	2	2	4	4	4	4
June	2	2	4	4	4	4
July	2	2	4	4	4	4
August	2	2	4	4	4	4
September	2	2	4	4	4	4

Table 3-145. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Auburn Ravine below Wise No.1 and No. 2 powerhouses that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	68%	68%	85%	85%	85%	85%
November	68%	68%	85%	85%	85%	85%
December	68%	68%	85%	85%	85%	85%
January	68%	68%	85%	85%	85%	85%
February	68%	68%	85%	85%	85%	85%
March	68%	85%	95%	95%	100%	96%
April	68%	85%	95%	95%	100%	96%
May	68%	68%	85%	85%	85%	85%
June	68%	68%	85%	85%	85%	85%
July	68%	68%	85%	85%	85%	85%
August	68%	68%	85%	85%	85%	85%
September	68%	68%	85%	85%	85%	85%
JUVENILE RAINBOW TROUT^b						
October	76%	76%	91%	91%	91%	91%
November	76%	76%	91%	91%	91%	91%
December	76%	76%	91%	91%	91%	91%
January	76%	76%	91%	91%	91%	91%
February	76%	76%	91%	91%	91%	91%
March	76%	91%	98%	98%	98%	91%
April	76%	91%	98%	98%	98%	91%
May	76%	76%	91%	91%	91%	91%
June	76%	76%	91%	91%	91%	91%
July	76%	76%	91%	91%	91%	91%
August	76%	76%	91%	91%	91%	91%
September	76%	76%	91%	91%	91%	91%

Table 3-145. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Auburn Ravine below Wise No.1 and No. 2 powerhouses that corresponds to PG&E's proposed Minimum Streamflows, as amended, for the reach. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	29%	54%	72%	72%	89%	95%
May	29%	29%	54%	54%	54%	54%
June	29%	29%	54%	54%	54%	54%

^a The maximum habitat for adult rainbow trout (6,738 square feet WUA per 1,000 linear feet of stream) occurs at 10 cfs (figure 6.3.1-31 on page E6.3- 46of the final license application).

^b The maximum habitat for juvenile rainbow trout (6,995 square feet WUA per 1,000 linear feet of stream) occurs at 8 cfs (figure 6.3.1-31 on page E6.3- 46 of the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach. The maximum habitat for spawning rainbow trout (3,059 square feet WUA per 1,000 linear feet of stream) occurs at 15 cfs (figure 6.3.1-31 on page E6.3-46 of the final license application).

Table 3-146. Minimum streamflows proposed by PG&E for the Drum-Spaulding Project – Mormon Ravine below Newcastle powerhouse header box (Compliance Point: YB-292) under measure DS-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1 or 5 ^a	5	5	5	5	5
November	1 or 5 ^a	5	5	5	5	5
December	1 or 5 ^a	5	5	5	5	5
January	1 or 5 ^a	5	5	5	5	5
February	1 or 5 ^a	5	5	5	5	5
March	1 or 5 ^a	5	5	5	5	5
April	1 or 5 ^a	5	5	5	5	5
May	1 or 5 ^a	5	5	5	5	5
June	1 or 5 ^a	5	5	5	5	5
July	1 or 5 ^a	5	5	5	5	5
August	1 or 5 ^a	5	5	5	5	5
September	1 or 5 ^a	5	5	5	5	5

^a 1 cfs if Newcastle powerhouse not operating; 5 cfs if Newcastle powerhouse is operating.

Table 3-147. Monthly minimum streamflows by water year type recommended by Reclamation for Mormon Ravine below the Newcastle powerhouse header box. (Source: adapted by staff from Reclamation, July 31, 2012)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total in acre-feet	Change from Historical
ECD				50	100	150	100						23,851	NA
CD				150	150	150	100	50					35,876	(40,165)
D				150	200	200	150	100					47,802	(41,237)
BN														
AN														
W														

Table 3-148. Required releases to the Middle Yuba River, South Yuba River, Canyon Creek, Fall Creek, Rucker Creek, and Bear River under the existing license. (Source: adapted by staff, from PG&E and NID, 2011a)

Sub-Basin	Reservoir	Development	Gage Location (USGS/PG&E No.)	Date	Required Minimum Flow (cfs)	Water Year Type
Middle Yuba River	Jackson Meadows	Bowman	Jackson Meadows Dam (11407815/YB-301)	Year- Round	5	All
	Milton Diversion Impoundment	Bowman	Milton Diversion Dam (11408500/YB-304)	Year- Round	3	All
Canyon Creek	Jackson Lake	Bowman	Jackson Lake Dam (11414700/YB-312)	Year- Round	0.75	All
	French Lake	Bowman	French Lake Dam (11414410/YB-306)	Year- Round	2.5	All
	Bowman- Spaulding Diversion Impoundment	Bowman	Downstream of Bowman-Spaulding Diversion Dam (11416500/YB-315)	4/1 to 10/31 11/1 to 3/31	3 2	All

Table 3-148. Required releases to the Middle Yuba River, South Yuba River, Canyon Creek, Fall Creek, Rucker Creek, and Bear River under the existing license. (Source: adapted by staff, from PG&E and NID, 2011a)

Sub-Basin	Reservoir	Development	Gage Location (USGS/PG&E No.)	Date	Required Minimum Flow (cfs)	Water Year Type
Bear River	Dutch Flat Afterbay	Chicago Park	Dutch Flat Afterbay Dam (11421790/YB-197)	5/1 to 10/31 11/1 to 4/30	10 5	All
	---	---	No Gage (Downstream of Upper Boardman Canal)	Year- Round	1	All
	Rollins	Rollins	Rollins Dam (11421900/YB-279)	5/1 to 10/31 11/1 to 4/30	75 20	Normal
				5/1 to 10/31 11/1 to 4/30	40 15	Less than Normal

Table 3-149. Minimum streamflows proposed by NID for Yuba-Bear Project – Middle Yuba River below Jackson Meadows reservoir dam (Compliance Point: USGS Streamflow Gage 11407815) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	11	11	13	15	20	35
November	11	11	13	15	20	35
December	11	11	13	15	20	35
January	11	11	13	15	20	35
February	11	11	13	15	25	40
March	11	11	16	25	35	60
April	30	30	30	50	60	100
May	60	60	75	90	110	120
June	21	21	30	50	75	100
July	11	11	16	25	35	60
August	11	11	13	15	25	40
September	11	11	13	15	25	40

Table 3-150. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Middle Yuba River below Jackson Meadows reservoir dam that corresponds to NID's proposed minimum flow, as amended, from Jackson Meadows reservoir dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	80%	80%	83%	88%	94%	100%
November	80%	80%	83%	88%	94%	100%
December	80%	80%	83%	88%	94%	100%
January	80%	80%	83%	88%	94%	100%
February	80%	80%	83%	88%	97%	100%
March	80%	80%	89%	97%	100%	98%
April	99%	99%	99%	99%	98%	94%
May	98%	98%	97%	96%	93%	92%
June	95%	95%	99%	99%	97%	94%
July	80%	80%	89%	97%	100%	98%
August	80%	80%	83%	88%	97%	100%
September	80%	80%	83%	88%	97%	100%
JUVENILE RAINBOW TROUT^b						
October	96%	96%	97%	99%	100%	97%
November	96%	96%	97%	99%	100%	97%
December	96%	96%	97%	99%	100%	97%
January	96%	96%	97%	99%	100%	97%
February	96%	96%	97%	99%	99%	95%
March	96%	96%	100%	99%	97%	89%
April	99%	99%	99%	92%	89%	79%
May	89%	89%	85%	81%	78%	75%
June	100%	100%	99%	92%	85%	79%
July	96%	96%	100%	99%	97%	89%
August	96%	96%	97%	99%	99%	95%
September	96%	96%	97%	99%	99%	95%

Table 3-150. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Middle Yuba River below Jackson Meadows reservoir dam that corresponds to NID's proposed minimum flow, as amended, from Jackson Meadows reservoir dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	45%	45%	45%	69%	79%	99%
May	79%	79%	89%	97%	100%	100%
June	33%	33%	45%	69%	89%	99%

^a The maximum habitat for adult rainbow trout (12,493 square feet WUA per 1,000 linear feet of stream) occurs at 40 cfs (figure 6.3.1-2 in the final license application).

^b The maximum habitat for juvenile rainbow trout (13,025 square feet WUA per 1,000 linear feet of stream) occurs at 20 cfs (figure 6.3.1-2 in the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach (table 2.1-9 in Technical Memorandum 3-2, *Instream Flow*). The maximum habitat for spawning rainbow trout (5,738 square feet WUA per 1,000 linear feet of stream) occurs at 120 cfs (figure 6.3.1-2 in the final license application).

Table 3-151. Minimum streamflows proposed by NID for Yuba-Bear Project – Middle Yuba River below Milton diversion dam (Compliance Point: USGS Streamflow Gage 11408550) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	4	6	6	10	10	15
November	4	6	6	10	10	10 or 15 ^a
December	4	6	6	10	10	10 or 15 ^a
January	4	6	6	10	10	10 or 15 ^a
February	4	6	6	10	15	15
March	4	6	6	20	25	30
April	6	10	15	30	35	40
May	6	20	30	50	60	70
June	6	15	20	30	35	40
July	4	6	10	15	20	20
August	4	6	6	10	15	15
September	4	6	6	10	15	15

^a In wet water years the minimum streamflow should be 15 cfs unless the precipitation measured at Bowman Lake from the previous July 1 up to but not including the first day of the month is equal to or less than 75 percent of the annual average precipitation for the same period for the most recent 30 years. In that case the minimum streamflow should be 10 cfs.

Table 3-152. NMFS proposed release or spill from Milton diversion dam; flows sufficient to achieve continuous minimum flows (in cubic feet per second), measured at USGS Gage 11408550 in the Middle Yuba River.^a (Source: Adapted by staff from NMFS, July 31, 2012)

Jan	Feb	Mar	Apr	May	Jun ^{b,c,d}	Jul ^e	Aug ^e	Sep ^e	Oct ^e	Nov ^e	Dec ^e
10	10	10	10	10	40-200	40	40	30	30	30	30

^a The above flow conditions are to be met in all water year types, based on the California Department of Water Resources' water year forecast of unimpaired year-round runoff in the Yuba River at Smartville, as set forth in the Department's "Bulletin 120 Water Year Conditions in California." An exception is that in extreme cases, water supplies may not be available to meet the flow requirements above. When the May Bulletin 120 forecasts year-round unimpaired runoff in the Yuba River at Smartville below 615,000 acre-feet, the licensees should conference with FERC (as the lead), NMFS, USACE, and the other entities and agencies implementing (prospective) spring-run Chinook salmon and/or steelhead reintroduction, and this contingency should be evaluated under NMFS' recommended condition for adaptive management, described below.

^b June 1-7: Flow releases from Milton dam sufficient to achieve a continuous 200 cfs discharge in the Middle Yuba River, measured at USGS Gage 11408550 (below Milton Dam).

^c June 8-14: Flow release(s) from Milton dam sufficient to achieve a continuous 100 cfs discharge in the Middle Yuba River, measured at USGS Gage 11408550.

^d June 15-30: Flow release(s) from Milton Dam to mimic the natural snowmelt recession: 4 days continuous release of 80 cfs, followed by 4 days of 60cfs, 4 days of 50cfs, 4 days of 40cfs, measured at USGS Gage 11408550.

^e Additional flows July-Dec may be required to maintain suitable water temperatures for holding and spawning downstream to the Plumbago Road crossing, at approximately river mile 25. NMFS recommends the funding, installation, operation and maintenance of telemetered water temperature and flow gages at this location; the installation of gages, their rating, and the determination of flows and temperatures should occur under the supervision of, or in cooperation with, the USGS.

July 1- September 15: From Milton dam, release or spill the greater of:

The flows sufficient to maintain water temperatures in the Middle Yuba River at the Plumbago Road crossing (RM 25) below 19°C, measured as the running average of the previous 7 days' daily average water temperature, or the flows to maintain a minimum instantaneous flow of 40 cfs in the Middle Yuba River, measured at USGS Gage 11408550 below Milton dam.

September 16- December 31: From Milton dam, release or spill the greater of:

The flows sufficient to maintain water temperatures in the Middle Yuba River at the Plumbago Road crossing (RM 25) below 14.4°C, measured as the running average of the previous 7 days' daily average water temperature, or the flows sufficient to maintain a minimum instantaneous flow of 30 cfs in the Middle Yuba River, measured at USGS Gage 11408550 below Milton dam.

Table 3-153. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Middle Yuba River below Milton diversion dam that corresponds to NID's proposed minimum flow releases, as amended, from Milton diversion dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	39%	48%	48%	62%	62%	74%
November	39%	48%	48%	62%	62%	74%
December	39%	48%	48%	62%	62%	74%
January	39%	48%	48%	62%	62%	74%
February	39%	48%	48%	62%	74%	74%
March	39%	48%	48%	82%	86%	91%
April	48%	48%	48%	91%	93%	96%
May	48%	48%	48%	99%	100%	100%
June	48%	48%	48%	91%	93%	96%
July	39%	48%	48%	74%	82%	82%
August	39%	48%	48%	62%	74%	74%
September	39%	48%	48%	62%	74%	74%
JUVENILE RAINBOW TROUT^b						
October	56%	65%	65%	77%	77%	86%
November	56%	65%	65%	77%	77%	86%
December	56%	65%	65%	77%	77%	86%
January	56%	65%	65%	77%	77%	86%
February	56%	65%	65%	77%	86%	86%
March	56%	65%	65%	92%	95%	99%
April	65%	77%	86%	99%	99%	100%
May	65%	92%	99%	100%	99%	97%
June	65%	86%	92%	99%	99%	100%
July	56%	65%	77%	86%	92%	92%
August	56%	65%	65%	77%	86%	86%
September	56%	65%	65%	77%	86%	86%

Table 3-153. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Middle Yuba River below Milton diversion dam that corresponds to NID's proposed minimum flow releases, as amended, from Milton diversion dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	27%	35%	44%	66%	70%	74%
May	27%	52%	66%	76%	76%	74%
June	27%	44%	52%	66%	70%	74%

^a The maximum habitat for adult rainbow trout (10,994 square feet WUA per 1,000 linear feet of stream) occurs at 70 cfs (figure 6.3.1-3 in the final license application).

^b The maximum WUA for juvenile rainbow trout (13,124 square feet WUA per 1,000 linear feet of stream) occurs at 50 cfs (figure 6.3.1-3 in the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach (table 2.1-9 in *Instream Flow Technical Memorandum 3-2*). The spawning rainbow trout WUA curve has a dual peak; the curve first peaks at 1,423 square feet WUA per 1,000 linear feet of stream at 49 cfs and then the curve dips and continues to increase to 1,879 square feet WUA at 1,136 cfs. (figure 6.3.1-3 in the final license application).

Table 3-154. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 2D site in Middle Yuba River below the Milton diversion dam that corresponds to NID's proposed minimum flow releases, as amended (without buffer flows) from Milton diversion dam. (Source: adapted by staff from Technical Memorandum 3-7, *Special-Status Amphibians - Foothill Yellow-Legged Frog Habitat Modeling*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	100%	99%	99%	92%	81%	77%
June	100%	100%	99%	99%	97%	95%
TADPOLES						
July	100%	100%	100%	98%	96%	96%
August	100%	100%	100%	100%	98%	98%
September	100%	100%	100%	100%	98%	98%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August and September.

Table 3-155. Minimum streamflows proposed by NID for Yuba-Bear Project – Wilson Creek below Wilson Creek diversion dam (Compliance Point: Act of Setting Outlet Works) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.25 or NF ^a	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
November	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
December	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
January	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
February	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
March	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
April	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
May	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
June	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
July	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
August	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF
September	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF	0.25 or NF

^a NF = natural flow entering Wilson Creek diversion dam from upstream.

Table 3-156. Minimum streamflows proposed by NID for Yuba-Bear Project – Jackson Creek below Jackson Lake dam (Compliance Point: USGS Streamflow Gage11414700) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.5	0.5	0.75	0.75	1	2
November	0.5	0.5	0.75	0.75	0.75	0.75
December	0.5	0.5	0.75	0.75	0.75	0.75
January	0.5	0.5	0.75	0.75	0.75	0.75
February	0.5	0.5	0.75	0.75	0.75	0.75
March	0.5	0.5	0.75	0.75	0.75	0.75
April	0.5	0.5	0.75	0.75	0.75	0.75
May	0.5	0.5	0.75	0.75	0.75	0.75
June	0.5	0.5	1	1	2	3
July	0.5	0.5	0.75	0.75	1	2
August	0.5	0.5	0.75	0.75	1	2
September	0.5	0.5	0.75	0.75	1	2

Table 3-157. Minimum streamflows proposed by NID for Yuba-Bear Project – Canyon Creek below French Lake dam (Compliance Point: USGS Streamflow Gage 11414410) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	6	9	9	9
November	5	5	6	9	9	9
December	5	5	6	9	9	9
January	5	5	6	9	9	9
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September	5	5	6	9	14	18

Table 3-158. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended (without buffer flows), in Canyon Creek below French Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	73%	73%	78%	90%	90%	90%
November	73%	73%	78%	90%	90%	90%
December	73%	73%	78%	90%	90%	90%
January	73%	73%	78%	90%	90%	90%
February	73%	73%	78%	90%	98%	100%
March	73%	73%	78%	90%	98%	100%
April	73%	73%	78%	90%	98%	100%
May	73%	73%	78%	90%	98%	100%
June	73%	73%	78%	90%	98%	100%
July	73%	73%	78%	90%	98%	100%
August	73%	73%	78%	90%	98%	100%
September	73%	73%	78%	90%	98%	100%
JUVENILE RAINBOW TROUT^b						
October	88%	88%	92%	98%	98%	98%
November	88%	88%	92%	98%	98%	98%
December	88%	88%	92%	98%	98%	98%
January	88%	88%	92%	98%	98%	98%
February	88%	88%	92%	98%	100%	97%
March	88%	88%	92%	98%	100%	97%
April	88%	88%	92%	98%	100%	97%
May	88%	88%	92%	98%	100%	97%
June	88%	88%	92%	98%	100%	97%
July	88%	88%	92%	98%	100%	97%
August	88%	88%	92%	98%	100%	97%
September	88%	88%	92%	98%	100%	97%

Table 3-158. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended (without buffer flows), in Canyon Creek below French Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	70%	70%	80%	94%	100%	100%
May	70%	70%	80%	94%	100%	100%
June	70%	70%	80%	94%	100%	100%

^a The maximum habitat for adult rainbow trout (5,141 square feet WUA per 1,000 linear feet of stream) occurs at 18 cfs (figure 6.3.1-9 in the final license application).

^b The maximum WUA for juvenile rainbow trout (6,549 square feet WUA per 1,000 linear feet of stream) occurs at 12 cfs (figure 6.3.1-9 in the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach (Table 2.1-9 in *Instream Flow* Technical Memorandum 3- 2). The maximum WUA for spawning rainbow trout (299 square feet WUA per 1,000 linear feet of stream) occurs at 14 cfs (figure 6.3.1-9 in the final license application).

Table 3-159. Minimum streamflows proposed by NID for Yuba-Bear Project – Canyon Creek below Faucherie Lake dam (Compliance Point: USGS Streamflow Gage 11414450) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	6	9	9	9
November	5	5	6	9	9	9
December	5	5	6	9	9	9
January	5	5	6	9	9	9
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September	5	5	6	9	14	18

Table 3-160. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's minimum flow releases, as amended, without buffer flows in Canyon Creek below Faucherie Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	89%	89%	91%	97%	97%	97%
November	89%	89%	91%	97%	97%	97%
December	89%	89%	91%	97%	97%	97%
January	89%	89%	91%	97%	97%	97%
February	89%	89%	91%	97%	100%	99%
March	89%	89%	91%	97%	100%	99%
April	89%	89%	91%	97%	100%	99%
May	89%	89%	91%	97%	100%	99%
June	89%	89%	91%	97%	100%	99%
July	89%	89%	91%	97%	100%	99%
August	89%	89%	91%	97%	100%	99%
September	89%	89%	91%	97%	100%	99%
JUVENILE RAINBOW TROUT^b						
October	98%	98%	99%	100%	100%	100%
November	98%	98%	99%	100%	100%	100%
December	98%	98%	99%	100%	100%	100%
January	98%	98%	99%	100%	100%	100%
February	98%	98%	99%	100%	98%	94%
March	98%	98%	99%	100%	98%	94%
April	98%	98%	99%	100%	98%	94%
May	98%	98%	99%	100%	98%	94%
June	98%	98%	99%	100%	98%	94%
July	98%	98%	99%	100%	98%	94%
August	98%	98%	99%	100%	98%	94%
September	98%	98%	99%	100%	98%	94%

Table 3-160. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's minimum flow releases, as amended, without buffer flows in Canyon Creek below Faucherie Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	47%	47%	53%	70%	83%	90%
May	47%	47%	53%	70%	83%	90%
June	47%	47%	53%	70%	83%	90%

^a The maximum habitat for adult rainbow trout (13,218 square feet WUA per 1,000 linear feet of stream) occurs at 15 cfs (figure 6.3.1-10 in the final license application).

^b The maximum WUA for juvenile rainbow trout (12,169 square feet WUA per 1,000 linear feet of stream) occurs at 7.5 cfs (figure 6.3.1-10 in the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach (table 2.1-9 in Instream Flow Technical Memorandum 3- 2). The maximum WUA for spawning rainbow trout (2,023 square feet WUA per 1,000 linear feet of stream) occurs at 40 cfs (figure 6.3.1-10 in the final license application).

Table 3-161. Minimum streamflows proposed by NID for Yuba-Bear Project – Canyon Creek below Sawmill Lake dam (Compliance Point: USGS Streamflow Gage 11414470) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	5	5	6	9	14	18
November	5	5	6	9	14	18
December	5	5	6	9	14	18
January	5	5	6	9	14	18
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September	5	5	6	9	14	18

Table 3-162. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows) in Canyon Creek below Sawmill Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	42%	42%	47%	59%	73%	80%
November	42%	42%	47%	59%	73%	80%
December	42%	42%	47%	59%	73%	80%
January	42%	42%	47%	59%	73%	80%
February	42%	42%	47%	59%	73%	80%
March	42%	42%	47%	59%	73%	80%
April	42%	42%	47%	59%	73%	80%
May	42%	42%	47%	59%	73%	80%
June	42%	42%	47%	59%	73%	80%
July	42%	42%	47%	59%	73%	80%
August	42%	42%	47%	59%	73%	80%
September	42%	42%	47%	59%	73%	80%
JUVENILE RAINBOW TROUT^b						
October	65%	65%	70%	81%	91%	95%
November	65%	65%	70%	81%	91%	95%
December	65%	65%	70%	81%	91%	95%
January	65%	65%	70%	81%	91%	95%
February	65%	65%	70%	81%	91%	95%
March	65%	65%	70%	81%	91%	95%
April	65%	65%	70%	81%	91%	95%
May	65%	65%	70%	81%	91%	95%
June	65%	65%	70%	81%	91%	95%
July	65%	65%	70%	81%	91%	95%
August	65%	65%	70%	81%	91%	95%
September	65%	65%	70%	81%	91%	95%

Table 3-162. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows) in Canyon Creek below Sawmill Lake dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
May	28%	28%	31%	42%	55%	62%
June	28%	28%	31%	42%	55%	62%
July	28%	28%	31%	42%	55%	62%

^a The maximum habitat for adult rainbow trout (11,820 square feet WUA per 1,000 linear feet of stream) occurs at 56 cfs (figure 6.3.1-11 in the final license application).

^b The maximum WUA for juvenile rainbow trout (15,156 square feet WUA per 1,000 linear feet of stream) occurs at 30 cfs (figure 6.3.1-11 in the final license application).

^c Rainbow trout spawning is expected to occur from May through July in this reach (table 2.1-9 in *Instream Flow Technical Memorandum 3-2*). The maximum WUA for spawning rainbow trout (643 square feet WUA per 1,000 linear feet of stream) occurs at 70 cfs (figure 6.3.1-11 in the final license application).

Table 3-163. Minimum streamflows proposed by NID for Yuba-Bear Project – Canyon Creek below Bowman-Spaulding diversion dam (Compliance Point: USGS Streamflow Gage 11416500) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	4	6	10	10	10	15
November	4	6	10	10	10	15
December	4	6	10	10	10	15
January	4	6	10	10	10	15 or 20
February	4	6	10	15	20	25
March	4	6	10	15	20	25
April	6	13	15	30	35	40
May	6	15	20	40	50	60
June	6	13	15	30	35	40
July	4	10	15	15	25	30
August	4	10	15	15	20	20
September	4	10	15	15	20	20

Table 3-164. NMFS proposal for release or spill from Bowman dam; flows sufficient to achieve continuous minimum flows (in cubic feet per second) in Canyon Creek below Bowman-Spaulding diversion dam, measured at USGS Gage 1 1416500.^a (Source: adapted by staff from NMFS, July 31, 2012)

Jan	Feb	Mar	Apr	May^b	Jun^b	Jul^c	Aug^c	Sep^c	Oct^c	Nov^c	Dec^c
15	15	15	15	75	75	30	30	30	30	30	30

^a The above flow conditions are to be met in all water year types, based on the California Department of Water Resources' water year forecast of unimpaired year-round runoff in the Yuba River at Smartville, as set forth in the Department's "Bulletin 120 Water Year Conditions in California." An exception is that in extreme cases, water supplies may not be available to meet the flow requirements above; when the May Bulletin 120 forecasts year-round unimpaired runoff in the Yuba River at Smartville below 615,000 acre-feet, the licensees should conference with FERC (as the lead), NMFS, USACE, and the other entities and agencies implementing (prospective) spring-run Chinook salmon and/or steelhead reintroduction, and this contingency should be evaluated under NMFS' recommended condition for adaptive management, described below.

^b Flows in May and June were designed to aid Spring-run Chinook volitional migration from Englebright Reservoir to the primary holding reaches above the confluence with Poorman Creek, at approximately river mile 28. If it is determined that the preferred method of reintroduction involves transport of the fish by truck to the holding reaches, the flows should be lowered to the values below:

- 25 and 50 cfs for May and June respectively, downstream of Spaulding Dam, measured at USGS Gage 11414210.
- 15 and 30 cfs for May and June respectively, downstream of Bowman dam, measured at USGS Gage 11416500.

^c Additional flows July-Dec may be required to maintain suitable water temperatures for holding and spawning/incubation downstream to the Poorman Creek Confluence, at approximately RM 28. NMFS recommends the funding, installation, operation and maintenance of telemetered water temperature and flow gages at this location; the installation of gages, their rating, and the determination of flows and temperatures should occur under the supervision of, or in cooperation with, USGS.

July 1- September 15: From Bowman and Spaulding dams, release or spill the greater of:

The flows sufficient to maintain water temperatures in the South Yuba River above the confluence with Poorman Creek (RM 28) below 19°C, measured as the running average of the previous 7 days' daily average water temperature, or the flows to maintain a minimum instantaneous flow of 50 cfs in the South Yuba River (measured at USGS Gage 11414210 below Spaulding dam) and a minimum instantaneous flow of 30 cfs in Canyon Creek (measured at USGS Gage 11416500 below Bowman dam).

Table 3-165. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended (without buffer flows) in Canyon Creek below Bowman-Spaulling diversion dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	40%	50%	66%	66%	66%	66%
November	40%	50%	66%	66%	66%	66%
December	40%	50%	66%	66%	66%	66%
January	40%	50%	66%	66%	66%	66%
February	40%	50%	66%	79%	87%	79%
March	40%	50%	66%	79%	87%	92%
April	50%	50%	66%	95%	97%	98%
May	50%	50%	66%	98%	98%	99%
June	50%	50%	66%	95%	97%	98%
July	50%	50%	66%	79%	92%	95%
August	40%	50%	66%	79%	87%	87%
September	40%	50%	66%	79%	87%	87%
JUVENILE RAINBOW TROUT^b						
October	64%	75%	89%	89%	89%	97%
November	64%	75%	89%	89%	89%	97%
December	64%	75%	89%	89%	89%	97%
January	64%	75%	89%	89%	89%	100%
February	64%	75%	89%	97%	100%	100%
March	64%	75%	89%	97%	100%	100%
April	75%	94%	97%	99%	98%	96%
May	75%	97%	100%	96%	92%	89%
June	75%	94%	97%	99%	98%	96%
July	75%	89%	97%	97%	100%	99%
August	64%	89%	97%	97%	100%	100%
September	64%	89%	97%	97%	100%	100%

Table 3-165. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout that corresponds to NID's proposed minimum flow releases, as amended (without buffer flows) in Canyon Creek below Bowman-Spaulding diversion dam. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
May	39%	75%	86%	100%	100%	100%
June	39%	68%	75%	97%	99%	100%
July	28%	59%	75%	75%	94%	97%

^a The maximum habitat for adult rainbow trout (10,982 square feet WUA per 1,000 linear feet of stream) occurs at 80 cfs (figure 6.3.1-12 in the final license application).

^b The maximum WUA for juvenile rainbow trout (14,431 square feet WUA per 1,000 linear feet of stream) occurs at 25 cfs (figure 6.3.1-12 in the final license application).

^c Rainbow trout spawning is expected to occur from May through July in this reach (table 2.1-9 in *Instream Flow Technical Memorandum 3-2*). The maximum WUA for spawning rainbow trout (2,181 square feet WUA per 1,000 linear feet of stream) occurs at 40 cfs (figure 6.3.1-12 in the final license application).

Table 3-166. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages at the foothill yellow-legged frog 2D Site in Canyon Creek below Bowman-Spaulding diversion dam that corresponds to NID's proposed minimum flows, as amended (without buffer flows), from Bowman-Spaulding diversion dam. (Source: adapted by staff from Technical Memorandum 3-7, *Special-Status Amphibians - Foothill Yellow-Legged Frog Habitat Modeling*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	100%	96%	92%	83%	80%	77%
June	100%	97%	96%	86%	84%	83%
TADPOLES						
July	100%	100%	89%	89%	69%	64%
August	100%	100%	89%	89%	79%	79%
September	100%	100%	89%	89%	79%	79%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August and September.

Table 3-167. Minimum streamflows proposed by NID for Yuba-Bear Project – Texas Creek below Texas Creek diversion dam at the Bowman-Spaulding diversion conduit (Compliance Point: New Streamflow Gage to be Constructed) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.6	1	1	2	3	3
November	0.6	1	1	2	3	3
December	0.6	1	1	2	3	3
January	0.6	1	1	2	3	3
February	0.6	1	1	2	3	3
March	0.6	1	1	2	3	3
April	0.6	1	1	2	3	3
May	0.6	1	1	2	3	3
June	0.6	1	1	2	3	3
July	0.6	1	1	2	3	3
August	0.6	1	1	2	3	3
September	0.6	1	1	2	3	3

Table 3-168. Minimum streamflows proposed by NID for Yuba-Bear Project – Clear Creek below Bowman-Spaulding conduit (Compliance Point: New Streamflow Gage to be Constructed) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	2	2
November	1	1	1	1	2	2
December	1	1	1	1	2	2
January	1	1	1	1	2	2
February	1	1	1	1	2	2
March	1	1	1	1	2	2
April	1	1	1	2	3	3
May	1	1	1	2	4	6
June	1	1	1	2	3	3
July	1	1	1	1	2	2
August	1	1	1	1	2	2
September	1	1	1	1	2	2

Table 3-169. NID's proposed minimum streamflows, as amended, in cfs in Clear Creek below Bowman-Spaulding Conduit^a (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	1	1	2	2
November	1	1	1	1	2	2
December	1	1	1	1	2	2
January	1	1	1	1	2	2
February	1	1	1	1	2	2
March	1	1	1	1	2	2
April	1	1	1	2	3	3
May	1	1	1	2	4	6
June	1	1	1	2	3	3
July	1	1	1	1	2	2
August	1	1	1	1	2	2
September	1	1	1	1	2	2
Total Acre- Feet ^b	724	724	724	905	1,691	1,813

^a Refer to Measure YB-AQR1, Part 3, in Amended Appendix E3 of NID's Amended Application regarding minimum streamflows in Clear Creek downstream of the Bowman-Spaulding conduit during Bowman-Spaulding conduit outages.

^b There is currently no required minimum flow at Clear Creek diversion dam. NID's proposed minimum flow releases, as amended, represents an increase over existing conditions from 724 acre-feet in Extreme Critically Dry water years to 1,813 acre-feet in Wet water years.

Table 3-170. Minimum streamflows proposed by NID for Yuba-Bear Project – Fall Creek below Fall Creek diversion dam at the Bowman-Spaulding conduit (Compliance Point: New Streamflow Gage to be Constructed) under measure YB-AQR1, Part 2.
(Source: Forest Service, *Preliminary Conditions and Recommendations*; August 2, 2012)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	1	1	2	3	4 or In = Out	4 or In = Out
November	1	1	2	3	4 or In = Out	4 or In = Out
December	1	1	2	3	4 or In = Out	4 or In = Out
January	1	1	2	3	4 or In = Out	4 or In = Out
February	1	1	2	3	4	4
March	1	1	2	3	4	4
April	1	1	2	3	4	4
May	12.5 or In = Out	12.5 or In = Out	15 or In = Out	20 or In = Out	20 or In = Out	20 or In = Out
June	5 or In = Out	5 or In = Out	6 or In = Out	7 or In = Out	8 or In = Out	9 or In = Out
July	1	1	2	3	4	4
August	1	1	2	3	4	4
September	1	1	2	3	4	4

Table 3-171. Minimum streamflows proposed by Forest Service (condition 29) and California Fish and Wildlife (recommendation 2.2) for Yuba-Bear Project – Fall Creek below Fall Creek diversion dam at Bowman-Spaulling conduit (compliance point: new streamflow gage to be constructed). (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	2	2	2	4	6	8
November	2	2	2	4	6	8
December	2	2	2	4	6	8
January	2	2	2	4	6	8
February	2	2	2	4	6	8
March	2	2	2	8	10	10
April	10	10	10	15	20	20
May	12.5	12.5	15	20	30	30
June	4	4	10	15	20	25
July	2	2	2	6	8	10
August	2	2	2	6	6	8
September	2	2	2	6	6	8

Table 3-172. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Fall Creek below Fall Creek diversion dam at the Bowman-Spaulding conduit that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows).^a (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^b						
October	63%	63%	80%	90%	90%	90%
November	63%	63%	80%	90%	90%	90%
December	63%	63%	80%	90%	90%	90%
January	63%	63%	80%	90%	90%	90%
February	63%	63%	80%	90%	95%	95%
March	63%	63%	80%	90%	95%	95%
April	63%	63%	80%	90%	95%	95%
May	--	--	--	--	--	--
June	--	--	--	--	--	--
July	63%	63%	80%	90%	90%	90%
August	63%	63%	80%	90%	90%	90%
September	63%	63%	80%	90%	90%	90%
JUVENILE RAINBOW TROUT^c						
October	71%	71%	87%	94%	94%	94%
November	71%	71%	87%	94%	94%	94%
December	71%	71%	87%	94%	94%	94%
January	71%	71%	87%	94%	94%	94%
February	71%	71%	87%	94%	98%	98%
March	71%	71%	87%	94%	98%	98%
April	71%	71%	87%	94%	98%	98%
May	--	--	--	--	--	--
June	--	--	--	--	--	--
July	71%	71%	87%	94%	98%	98%
August	71%	71%	87%	94%	98%	98%
September	71%	71%	87%	94%	98%	98%

Table 3-172. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Fall Creek below Fall Creek diversion dam at the Bowman-Spaulding conduit that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows).^a (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^d						
May	--	--	--	--	--	--
June	--	--	--	--	--	--
July	15%	15%	27%	38%	46%	46%

^a Due to the channel geometry in Fall Creek and the limits of NID's ability to make releases into the creek during the Instream Flow Study, the WUA curves for adult and juvenile rainbow trout continue to increase past the hydraulic extrapolation limit (163 cfs). Therefore, for the above table, NID truncated the analysis at a maximum flow of 163 cfs..

^b The maximum habitat for adult rainbow trout (3,147 square feet WUA per 1,000 linear feet of stream) occurs at 8 cfs (figure 6.3.1-14 in the final license application).

^c The maximum WUA for juvenile rainbow trout (3,545 square feet WUA per 1,000 linear feet of stream) occurs at 6 cfs (figure 6.3.1-14 in the final license application).

^d Rainbow trout spawning is expected to occur from May through July in this reach (table 2.1-9 in Instream Flow Technical Memorandum 3-2). The maximum WUA for spawning rainbow trout (6,663 square feet WUA per 1,000 linear feet of stream) occurs at 30 cfs (figure 6.3.1-14 in the final license application).

Table 3-173. Minimum streamflows proposed by NID for Yuba-Bear Project – Trap Creek below Bowman-Spaulding conduit (Compliance Point: New Streamflow Gage to be Constructed) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.25	0.25	0.5	0.5	1	1.5
November	0.25	0.25	0.5	0.5	1	1.5
December	0.25	0.25	0.5	0.5	1	1.5
January	0.25	0.25	0.5	0.5	1	1.5
February	0.25	0.25	0.5	0.5	1	1.5
March	0.25	0.25	0.5	1	1.5	1.5
April	0.25	0.75	0.75	2	3	3
May	0.25	0.75	0.75	3	3	3
June	0.25	0.75	0.75	2	3	3
July	0.25	0.25	0.5	0.5	1	1.5
August	0.25	0.25	0.5	0.5	1	1.5
September	0.25	0.25	0.5	0.5	1	1.5

Table 3-174. Minimum streamflows proposed by NID for Yuba-Bear Project – Rucker Creek below Bowman-Spaulding conduit (Compliance Point: New Streamflow Gage to be Constructed) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	0.3	0.3	0.5	2	2	2
November	0.3	0.3	0.5	2	2	2
December	0.3	0.3	0.5	2	2	2
January	0.3	0.3	0.5	2	2	2
February	0.3	0.3	0.5	2	2	2
March	0.3	0.3	0.5	2	2	2
April	0.3	0.3	0.5	2	2	2
May	0.3	0.3	0.5	2	3	3
June	0.3	0.3	0.5	2	2	2
July	0.3	0.3	0.5	2	2	2
August	0.3	0.3	0.5	2	2	2
September	0.3	0.3	0.5	2	2	2

Table 3-175. Minimum streamflows proposed by NID for Yuba-Bear Project – Bear River below Dutch Flat afterbay dam (Compliance Point: USGS Streamflow Gage 11421790) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	7	7	8	10	13	13
November	7	7	8	10	13	13
December	7	7	8	10	13	13
January	7	7	8	10	13	13
February	10	10	15	20	22	30
March	15	15	20	25	30	40
April	20	20	25	30	35	45
May	15	15	20	25	30	40
June	10	10	15	20	22	30
July	10	10	10	10	12	15
August	10	10	10	10	12	15
September	10	10	10	10	12	15

Table 3-176. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Bear River below Dutch Flat afterbay dam that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows).^a (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^b						
October	82%	82%	86%	92%	97%	97%
November	82%	82%	86%	92%	97%	97%
December	82%	82%	86%	92%	97%	97%
January	82%	82%	86%	92%	97%	97%
February	92%	92%	100%	100%	99%	97%
March	100%	100%	100%	98%	97%	93%
April	100%	100%	98%	97%	95%	91%
May	100%	100%	100%	98%	97%	97%
June	92%	92%	100%	100%	99%	97%
July	92%	92%	92%	92%	95%	100%
August	92%	92%	92%	92%	95%	100%
September	92%	92%	92%	92%	95%	100%
JUVENILE RAINBOW TROUT^c						
October	90%	90%	93%	97%	99%	99%
November	90%	90%	93%	97%	99%	99%
December	90%	90%	93%	97%	99%	99%
January	90%	90%	93%	97%	99%	99%
February	97%	97%	100%	97%	96%	91%
March	100%	100%	97%	94%	91%	85%
April	97%	97%	94%	91%	88%	84%
May	100%	100%	97%	94%	91%	85%
June	97%	97%	100%	97%	96%	91%
July	97%	97%	97%	97%	98%	100%
August	97%	97%	97%	97%	98%	100%
September	97%	97%	97%	97%	98%	100%

Table 3-176. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in Bear River below Dutch Flat afterbay dam that corresponds to NID's proposed minimum flow releases, as amended, (without buffer flows).^a (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*, NID and PG&E 2010)

Month	Extreme Critically Dry Water Years	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^d						
April	79%	79%	86%	92%	96%	100%
May	69%	69%	79%	86%	92%	99%
June	52%	52%	69%	79%	82%	92%

^a Due to the geometry of the reach, the WUA curves for most of the adult rainbow trout life stages have two maximum peaks. The first peak occurs at a flow of less than about 20 cfs, and then the curve dips and continues to increase to the maximum extrapolated value. This is due primarily to the altered state of the reach (i.e., flood plain with hydraulic mining debris). For the above table, NID truncated the analysis at 160 cfs.

^b The maximum habitat for adult rainbow trout (3,819 square feet WUA per 1,000 linear feet of stream) occurs at 20 cfs (figure 6.3.1-15 in the final license application).

^c The maximum WUA for juvenile rainbow trout (7,437 square feet WUA per 1,000 linear feet of stream) occurs at 15 cfs (figure 6.3.1-15 in the final license application).

^d Rainbow trout spawning is expected to occur from April through June in this reach (table 2.1-9 in *Instream Flow* Technical Memorandum 3- 2). The maximum WUA for spawning rainbow trout (4,410 square feet WUA per 1,000 linear feet of stream) occurs at 50 cfs (figure 6.3.1-15 in the final license application).

Table 3-177. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 2D Site in Bear River below Dutch Flat afterbay dam that corresponds to NID's proposed minimum flows, as amended (without buffer flows), from the Dutch Flat afterbay dam. (Source: adapted by staff from Technical Memorandum 3-7, *Special-Status Amphibians – Foothill Yellow-Legged Frog Habitat Modeling*; NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	98%	98%	15%	20%	22%	30%
June	98%	98%	98%	98%	12%	15%
TADPOLES						
July	100%	100%	100%	100%	99%	95%
August	100%	100%	100%	100%	99%	95%
September	100%	100%	100%	100%	99%	95%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August, and September.

Table 3-178. Minimum streamflows proposed by NID for Yuba-Bear Project – Bear River below Rollins dam (Compliance Point: USGS Streamflow Gage 11422500) under measure YB-AQR1, Part 2. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
October	20	40	40	55	65	65
November	15	20	23	30	40	50
December	15	20	23	30	40	50
January	15	20	23	30	40	50
February	15	20	23	30	40	50
March	15	20	25	30	40	50
April	15	40	40	50	75	75
May	20	45	45	65	100	100
June	20	50	50	65	125	125
July	20	50	50	70	109	125
August	20	50	50	70	109	125
September	20	50	50	70	80	80

Table 3-179. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River below Rollins dam that corresponds to NID's proposed minimum flow releases, as amended. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
ADULT RAINBOW TROUT^a						
October	35%	63%	63%	77%	83%	83%
November	26%	35%	40%	51%	63%	73%
December	26%	35%	40%	51%	63%	73%
January	26%	35%	40%	51%	63%	73%
February	26%	35%	40%	51%	63%	73%
March	26%	35%	43%	51%	63%	73%
April	26%	63%	63%	73%	89%	89%
May	35%	68%	68%	83%	97%	97%
June	35%	73%	73%	83%	100%	100%
July	35%	73%	73%	86%	98%	100%
August	35%	73%	73%	86%	98%	100%
September	35%	73%	73%	86%	91%	91%
JUVENILE RAINBOW TROUT^b						
October	83%	98%	98%	100%	99%	99%
November	74%	83%	86%	93%	98%	100%
December	74%	83%	86%	93%	98%	100%
January	74%	83%	86%	93%	98%	100%
February	74%	83%	86%	93%	98%	100%
March	74%	83%	89%	93%	98%	100%
April	74%	98%	98%	100%	98%	98%
May	83%	99%	99%	99%	94%	94%
June	83%	100%	100%	99%	90%	90%
July	83%	100%	100%	99%	93%	90%
August	83%	100%	100%	99%	93%	90%
September	83%	100%	100%	99%	98%	98%

Table 3-179. Percent of maximum WUA for adult, juvenile, and spawning rainbow trout in the Bear River below Rollins dam that corresponds to NID's proposed minimum flow releases, as amended. (Source: adapted by staff from Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SPAWNING RAINBOW TROUT^c						
April	37%	65%	65%	70%	79%	79%
May	45%	67%	67%	75%	87%	87%
June	45%	70%	70%	75%	93%	93%

^a The maximum habitat for adult rainbow trout (17,777 square feet WUA per 1,000 linear feet of stream) occurs at 150 cfs (figure 6.3.1-16 in the final license application).

^b The maximum WUA for juvenile rainbow trout (23,237 square feet WUA per 1,000 linear feet of stream) occurs at 50 cfs (figure 6.3.1-16 in the final license application).

^c Rainbow trout spawning is expected to occur from April through May in this reach (table 2.1-9 in Instream Flow Technical Memorandum 3-2). The maximum WUA for spawning rainbow trout (14,146 square feet WUA per 1,000 linear feet of stream) occurs at 225 cfs (figure 6.3.1-16 in the final license application).

Table 3-180. Percent of WUA for foothill yellow-legged frog eggs and tadpole life stages^a at the foothill yellow-legged frog 2D model site in the Bear River below Rollins dam that corresponds to NID's proposed minimum flows, as amended, (without buffer flows), below Rollins dam and powerhouse. (Source: adapted by staff from Technical Memorandum 3-7, *Special- Status Amphibians - Foothill Yellow-Legged Frog Habitat Modeling* ; NID and PG&E 2010)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
EGGS						
May	99%	93%	93%	90%	85%	85%
June	99%	92%	92%	90%	80%	78%
TADPOLES						
July	100%	100%	100%	99%	89%	85%
August	100%	100%	100%	99%	89%	85%
September	100%	100%	100%	99%	96%	96%

^a Foothill yellow-legged frog eggs are expected to be present in May and June and foothill yellow-legged frog tadpoles in July, August and September.

Table 3-181. Locations in Drum-Spaulding Project where canal outages affect Minimum Streamflows. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Location (Stream – Facility)	Typical historical outage period/duration	Minimum Streamflows During Annual Planned Outages, Non- Routine Planned Outages and Emergency Outages
Bear River – YB-198	Approximately 2 weeks in late September and early October (Drum Canal) or approximately 2 weeks from late March to early April (South Yuba Canal)	In the event that the total flow in the Drum Canal upstream of YB137 and South Yuba Canal upstream of YB-139 is less than required for the Minimum Streamflow at YB-198, the Minimum Streamflow shall be no less than the natural flow in Bear River at YB-198, and Licensee shall also release as much water as is available in the two canals to meet as much of the Minimum Streamflow as set forth in Part 2 of this Measure as possible.
Bear River below Drum afterbay – YB-44	Approximately 2 weeks in late September and early October (Drum Canal) or approximately 2 weeks from late March to early April (South Yuba Canal)	In the event that the total flow in the Drum Canal upstream of YB137, the South Yuba Canal upstream of YB-139 and natural flow in the Bear River upstream of Drum Afterbay is less than required for the Minimum Streamflow at YB-44, the Minimum Streamflow shall be the natural inflow to Drum Afterbay and shall be complied with by Licensee not diverting water from Drum Afterbay.
Canyon Creek below Towle canal diversion – YB-282	Approximately 2 weeks in late September and early October (Drum Canal)	When the Drum Canal is out of service, the Minimum Streamflow below Towle Canal Diversion Dam (YB-282) shall be no less than the natural flow in Canyon Creek as measured at YB-280.
Little Bear River below Alta powerhouse – YB-98	Approximately 2 weeks in late September and early October (Drum Canal) or approximately 2 weeks in mid-May (Towle Canal)	When the Alta Powerhouse relays off-line, the Drum Canal or the Towle Canal is out of service, the Minimum Streamflow in the Little Bear River below Lower Boardman Canal shall be 0.25 cfs. Licensee shall not divert natural flow from the Little Bear River during these outages.
Dry Creek below Halsey afterbay dam – YB-62A	Approximately 3 weeks in late October and early November (Bear River Canal)	When Bear River Canal is out of service, the Minimum Streamflows shall be no less than leakage from Halsey Afterbay Dam as measured at YB-62A.

Table 3-181. Locations in Drum-Spaulding Project where canal outages affect Minimum Streamflows. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Location (Stream – Facility)	Typical historical outage period/duration	Minimum Streamflows During Annual Planned Outages, Non- Routine Planned Outages and Emergency Outages
Rock Creek below Rock Creek reservoir – YB-86	Approximately 3 weeks in late October and early November (Bear River Canal) or approximately 1 week in mid- November (Wise Canal) or any other portion of the lower Drum Canal system (approximately 5 weeks from mid- October to late November)	When Bear River Canal or Upper Wise Canal is out of service, the Minimum Streamflow shall be 0.50 cfs.
Mormon ravine below Newcastle powerhouse header box - YB- 292	Approximately 3 weeks in late October and early November (Bear River Canal) or approximately 1 week in late November (Wise Canal) or approximately 1 week in mid- November (South Canal)	When the Bear River Canal, Upper Wise Canal, Lower Wise Canal or South Canal are out of service, no Minimum Streamflows shall be required at YB-292.
South Yuba canal above Deer Creek forebay – YB-34	Approximately 2 weeks in late March to early April (South Yuba Canal and/or Chalk Bluff Canal)	When the South Yuba Canal or Chalk Bluff Canal are out of service, no Minimum Streamflows shall be required at YB-34.

Table 3-182. Higher flow spill cessation schedule in the South Yuba River below Lake Spaulding dam. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Water Year Type:	Wet	Above Normal	Below Normal	Dry
Target Flow	Target Number of Days to Hold Target Flows			
250- 420 cfs	No less than 6 consecutive days	No less than 4 consecutive days	No less than 2 consecutive days	--

Table 3-183. Lower flow spill cessation schedule in the South Yuba River below Lake Spaulding dam. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Target Flow, +/-20% ^a	Target Number of Days to Hold Target Flows
250 cfs	1 days
200 cfs	2 days
150 cfs	2 days
125 cfs	3 days
100 cfs	3 days
75 cfs	4 days
60 cfs	4 days
50 cfs ^b	2 days

^a Once the facility modifications (discussed later in this measure) are completed, Target Flows at or below 75 cfs will be $\pm 10\%$.

^b If the Minimum Streamflow in Part 2 of this measure is greater than 50 cfs, the spill cessation will stop at the Minimum Streamflow.

Table 3-184. Spill cessation schedule in the Middle Yuba River below Milton diversion dam after May 1.^a (Source: adapted by staff from PG&E 2011a and NID 2011a)

Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11408550
6 Days	300 cfs
3 Days	225 cfs
3 Days	150 cfs
3 Days	100 cfs
3 Days	80 cfs
2 Days	60 cfs
2 Days	50cfs

^a If the peak of the spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 50 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Table 3-185. Spill cessation schedule in the Canyon Creek below Bowman-Spaulding diversion dam after April 1.^a (Source: adapted by staff from PG&E 2011a and NID 2011a)

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11416500
1 day	275 cfs
1 day	230 cfs
1 day	200 cfs
2 days	160 cfs
2 days	130 cfs
2 days	100 cfs
2 days	85 cfs
3 days	70 cfs
3 days	55 cfs
4 days	45 cfs

^a If the peak of the spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 45 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Table 3-186. Spill cessation schedule in the Bear River below Dutch Flat afterbay dam for spills at Dutch Flat afterbay lasting 3 days or less.^a (Source: adapted by staff from PG&E 2011a and NID 2011a)

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11421770
1 day	75 cfs
1 day	50 cfs
1 day	25 cfs

^a If the peak of the licensee-caused spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 25 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Table 3-187. Spill cessation schedule in the Bear River below Dutch Flat afterbay dam for licensee-caused spills at Dutch Flat afterbay lasting longer than 3 days.^a (Source: adapted by staff from PG&E 2011a and NID 2011a)

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11421770
7 days	75 cfs
7 days	50 cfs
7 days	25 cfs

^a If the peak of the licensee-caused spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of the licensee-caused spill is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the licensee-caused spill cessation schedule continuing until Target Flows are 25 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Table 3-188. New gages or existing gages for monitoring compliance with minimum streamflows in the Drum-Spaulding Project that require modification for DS-AQR1, Streamflows.
(Source: adapted by staff from PG&E 2011a and NID 2011a)

Location	USGS Gage No.	Licensee Gage No	Existing or New Gage	Latitude (North)	Longitude (West)	Elevation (feet)
South Yuba River – below Lake Spaulding dam (at Langs Crossing)	11414250	YB-29	Existing - needs modification	39°19'07"	120°39'24"	4,460 (Approx.)
North Fork of the North Fork American River – below Lake Valley reservoir	--	YB-104	Existing – needs modification	39°17'57"	120°35'53"	5,730 (Approx.)
North Fork of the North Fork American River – below Lake Valley canal diversion dam	--	YB-236	Existing – needs modification	39°17'54"	120°36'10"	5,730 (Approx.)
Canyon Creek – below Towle canal diversion dam	11426196	YB-282	Existing – needs modification	39°14'31"	120°45'03"	4,480 (Approx.)
Little Bear River – below Alta powerhouse tailrace (below Lower Boardman canal diversion dam)	--	YB-98	Existing – needs modification	39°12'57"	120°48'13"	3,590 (Approx.)
Lake Creek – below Feeley Lake dam	11414350	YB-207	Existing - needs modification	39°24'01"	120°38'14"	6,710 (Approx.)
Rucker Creek – below Rucker Lake dam	11414280	YB-210	Existing - needs modifications	39°21'20"	120°39'55"	5,350 (Approx.)
Unnamed tributary – below Meadow Lake dam	--	YB-217	New	39°24'6"	120°29'49"	7,200 (Approx.)

Table 3-188. New gages or existing gages for monitoring compliance with minimum streamflows in the Drum-Spaulding Project that require modification for DS-AQR1, Streamflows.
(Source: adapted by staff from PG&E 2011a and NID 2011a)

Location	USGS Gage No.	Licensee Gage No	Existing or New Gage	Latitude (North)	Longitude (West)	Elevation (feet)
White Rock Creek – below White Rock Lake dam	--	YB-218	New	39°25'04"	120°23'13"	7,820 (Approx.)
Sixmile Creek – below Kelley Lake dam	--	YB-226	Existing – needs modification	39°18'42"	120°34'55"	5,880 (Approx.)

Table 3-189. Minimum streamflow compliance monitoring locations for the Yuba-Bear Hydroelectric Project. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Location	USGS Gage No.	Licensee Gage No.	Gage Name	Location (Latitude and Longitude)		Elevation (feet)
Middle Yuba River – below Jackson Meadows dam	11407815	YB-301	Middle Yuba River Controlled Release at Jackson Meadows dam, near Sierra City, CA	39°30'36"	120°33'15"	5,800
Middle Yuba River – below Milton diversion dam	11408550	YB-304	Middle Yuba River below Milton dam, near Sierra City, CA	39°31'19"	120°34'57"	5,690
Jackson Creek – below Jackson dam	11414700	YB-312	Jackson Creek below Jackson Lake, near Sierra City, CA	39°27'53"	120°33'46"	6,570
Canyon Creek – below French dam	11414410	YB-306	Canyon Creek below French Lake, near Cisco, CA	39°25'16"	120°32'30"	6,590
Canyon Creek – below Faucherie dam	11414450	YB-308	Canyon Creek below Faucherie Lake, near Cisco, CA	39°25'46"	120°34'06"	6,080
Canyon Creek – below Sawmill dam	11414470	YB-310	Canyon Creek below Sawmill Lake, near Graniteville, CA	39°26'44"	120°36'05"	5,790
Canyon Creek – below Bowman-Spaulding diversion dam	11416500	YB-315	Canyon Creek below Bowman Lake, CA	39°26'23"	120°39'37"	5,300
Texas Creek – below Texas Creek diversion dam	--	Proposed YB-317	--	39°21'20" ^a	120°39'52" ^a	5,400 ^a

Table 3-189. Minimum streamflow compliance monitoring locations for the Yuba-Bear Hydroelectric Project. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Location	USGS Gage No.	Licensee Gage No.	Gage Name	Location (Latitude and Longitude)		Elevation (feet)
Clear Creek – below Bowman- Spaulding diversion conduit	--	Proposed YB-318	--	39°22'51" ¹	120°40'52" ¹	5,350 ¹
Fall Creek – below Fall Creek diversion dam	--	Proposed YB-319	--	39°22'51" ¹	120°40'52"	5,350 ¹
Trap Creek – below Bowman- Spaulding diversion conduit	--	Proposed YB-320	--	39°21'57" ¹	120°40'48"	5,350 ¹
Rucker Creek – below Rucker Creek diversion gate	--	Proposed YB-321	--	39°24'17"	120°40'32"	5,300 ¹
Bear River – below Dutch Flat afterbay dam	11421770	YB-197	Bear River below Dutch Flat afterbay near Dutch Flat, CA	39°12'49"	120°50'39"	2,600
Bear River – below Rollins dam	11422500	YB-196	Bear River below Rollins dam Near Cisco, CA	39°08'3"	120°57'11"	1,975

^a This is an estimate of where the proposed gage will be located.

Table 3-190. Remote project-affected stream reaches where flow setting measures are proposed for compliance with minimum streamflows. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Affected stream reach	Development	Non-winter frequency
Drum-Spaulding Project		
Texas Cr. below Upper Rock Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Texas Cr. below Lower Rock Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Unnamed trib below Culbertson Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Lindsey Cr below Middle Lindsey Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Lindsey Cr below Lower Lindsey Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Lake Cr. below Feeley Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Lake Cr. below Carr Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Rucker Cr. below Blue Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Rucker Cr. below Rucker Lake dam	Spaulding No. 3	Twice each week, about 3-day intervals; compliance is act of resetting
Unnamed trib. below Fuller Lake dam	Spaulding No. 3	Check and reset as necessary with compliance at gage YB-211
Unnamed trib. below Meadow Lake dam	Spaulding No. 1 and No. 2	Twice each week, about 3-day intervals; compliance is act of resetting
White Rock Cr. below White Rock Lake	Spaulding No. 1 and No. 2	Twice each week, about 3-day intervals; compliance is act of resetting
Bloody Cr. below Lake Sterling dam	Spaulding No. 1 and No. 2	At 2-week intervals; compliance is act of resetting
Unnamed trib. below Kidd Lake dam	Spaulding No. 1 and No. 2	Twice each week, about 3-day intervals; compliance is act of resetting
Cascade Cr. below Lower Peak Lake dam	Spaulding No. 1 and No. 2	Twice each week, about 3-day intervals; compliance is act of resetting
Yuba-Bear Project		
Wilson Cr. below Wilson Lake dam	Bowman	Weekly; compliance is act of resetting

Table 3-191. Assumptions included in operations model runs for existing license conditions and proposed project under recent and projected (year 2062) water demands. (Source: adapted by staff from PG&E's Supplement No. 2 and NID's Supplement No.; PG&E 2011a and NID 2011a)

Model Scenario	Description
Existing License conditions (no-action alternative)	<ul style="list-style-type: none"> • Minimum instream flows and reservoir elevation requirements as described in the existing Yuba-Bear Hydroelectric Project license and the existing Drum-Spaulding Project license; • Additional buffer flows above minimum instream flow requirements; • Water delivery requirements to NID and PCWA based on average water delivery during WY 2001 to 2009; • The retirement of Alta powerhouse unit no. 2 (Drum-Spaulding Project); • Re-operation of Dutch Flat no. 1 and no. 2; • PG&E's winter/spring operating plan; and • Updated reservoir bathymetry at several project reservoirs.
Proposed Project – Recent Water Delivery Demands	<ul style="list-style-type: none"> • All assumptions of the no-action alternative; • Proposed water year types under part 1 of measures DS-AQR1 and YB-AQR1; • Proposed minimum streamflows under part 2 of measures DS-AQR1 and YB-AQR1; • Additional buffer flows above proposed minimum streamflows; • Spill cessation schedules for Lake Spaulding dam, Milton diversion dam, Bowman-Spaulding diversion dam, and Dutch Flat afterbay under part 7 of measures DS-AQR1 and YB-AQR1; • Supplemental boating flows for whitewater boating below French Lake dam, Milton diversion dam, and Bowman-Spaulding diversion dam under part 7 of measure YB-AQR1; • Fordyce Lake drawdown schedule under part 5 of measure DS-AQR1; and • Minimum reservoir elevations to meet proposed minimum streamflows;
Proposed Project – Projected Water Delivery Demands	<ul style="list-style-type: none"> • All assumptions of the proposed project using recent water delivery demands except this scenario uses 2062 projected water delivery demands.

Table 3-192. Model-estimated power generation (GWh/year) by powerhouse under the existing license and proposed project assuming water demand at recent levels and projected demand in 2062. (Source: adapted by staff from PG&E's Supplement No. 2 and NID's Supplement No. 1 PG&E 2011a and NID 2011a)

Project	Powerhouse	No-Action Alternative	Proposed Project- Recent Water Demand	Proposed Project- Projected Water Demand
Drum-Spaulding	Spaulding no. 3	34.8	30.7	31.3
	Spaulding no. 1	32.4	10.5	29.2
	Spaulding no. 2	10.9	29.3	11.7
	Drum no. 1	93.2	78.8	69.1
	Drum no. 2	266.2	241.4	234.5
	Alta	5.1	5.1	6
	Dutch Flat no. 1	128.8	115.1	113.4
	Halsey	51.3	48.4	46.1
	Wise	69.2	64.3	61.5
	Wise no. 2	7.6	6.5	6.9
	Newcastle	27.4	23.1	16.1
	Total	726.9	653.2	625.8
Yuba-Bear	Bowman	12.1	10.8	11.2
	Dutch Flat no. 2	48.4	41.1	37.7
	Chicago Park	139.5	122.7	117.8
	Rollins	66.2	61.6	57.9
	Rollins no. 2	NA	16.7	15.7
	Total	266.2	252.9	240.3

Table 3-193. Streamflows in South Yuba River below Lake Spaulding dam as measured at YB-29 including required Minimum Streamflows, range of Supplemental Flow and total minimum flow. (Source: adapted by staff from Forest Service Preliminary Conditions and Recommendations; August 23, 2012)

Period	Minimum Streamflow (cfs)	Supplemental Flow Range (cfs)	Total Minimum Flow Range (cfs)
CRITICALLY DRY WATER YEARS			
June 15 -30	35	--	35
July	25	0-5	25-30
August	20	0-10	20-30
September 1 - 15	20	0-10	20-30
DRY WATER YEARS			
June 15 -30	40	--	40
July	30	--	30
August	23	0-7	23-30
September 1 - 15	23	0-7	23-30
BELOW NORMAL WATER YEARS			
June 15 - 30	50	--	50
July	35	--	35
August	25	0-5	25-30
September 1 - 15	25	0-5	25-30

Table 3-194. Power generation and percent change compared to existing license conditions with implementation of four flow scenarios including the Supplemental Flow (SF) or Block Flow (BF) proposals for the South Yuba River (SYR) below Lake Spaulding dam and Block Flow proposal for the Middle Yuba River (MYR) below Milton diversion dam. (Source: adapted by staff from Additional Information Regarding Water Temperature and Modeling Results; NID, January 23, 2013)

	Percent change			
	SF in SYR	BF in MYR, SF in SYR	BF in MYR and SYR	BF in SYR
YUBA-BEAR				
Generation	236 GWh/yr	235 GWh/yr	233 GWh/yr	234 GWh/yr
Annual average	-11.4	-11.8	-12.3	-11.9
By Water Year				
extreme critical and critical dry	-15.6	-16.7	-17.2	-16.2
dry	-10.6	-11	-11.7	-11.3
below normal	-9.6	-10.1	-10.5	-10.1
above normal	-13.1	-13.6	-14.1	-13.7
wet	-10.8	-11	-11.4	-11.2
DRUM-SPAULDING				
Generation	652 GWh/yr	649 GWh/yr	647 GWh/yr	650 GWh/yr
Annual average	-10.3	-10.7	-11	-10.6
By Water Year				
extreme critical and critical dry	-14.1	-15.4	-15.9	-14.7
dry	-11.1	-11.4	-12	-11.7
below normal	-9.3	-9.7	-9.9	-9.6
above normal	-11.9	-12.4	-12.6	-12
wet	-8.1	8.4	-8.6	-8.2
DEER CREEK				
Generation	22.4 GWh/yr	22.4 GWh/yr	22.4 GWh/yr	22.4 GWh/yr
Annual average	-1.0	-1.1	-1.1	-1

Table 3-195. Percent of target water delivery available to NID and PCWA with implementation of four flow scenarios including the Supplemental Flow (SF) or Block Flow (BF) proposals for the South Yuba River (SYR) below Lake Spaulding dam and Block Flow proposal for the Middle Yuba River (MYR) below Milton diversion dam. (Source: adapted by staff from Additional Information Regarding Water Temperature and Modeling Results; NID, January 23, 2013)

		Scenario 1	Scenario 2	Scenario 3	Scenario 4
			BF in MYR, SF in SYR	BF in MYR and SYR	
Water Year Type		SF in SYR			BF in SYR
NID					
1976	critical dry	98	98	97	97
1977	extreme critical dry	46	46	44	46
1978	above normal	91	91	90	91
1989	above normal	100	100	94	99
PCWA					
1976	critical dry	100	100	100	100
1977	extreme critical dry	63	63	62	62
1978	above normal	90	90	91	90
1989	above normal	100	100	100	100

NOTE: All other water years between 1976 and 2008 would have met 100 percent of water delivery target

Table 3-196. Drum-Spaulding Project canals included in Fish Protection and Management during Canal Outages Plan. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Canal	Development	Facility Description
Lake Valley canal	Drum No. 1 and No.2	Lake Valley Canal diverts water from Lake Valley Canal Diversion Dam 2.41 miles (mi) to Drum Canal. The canal includes 0.96 mi of open ditch, 0.56 mi of flume, and 0.89 mi of pipe. The canal is 8.7 feet (ft) wide and 3.5 ft deep, and it has a maximum flow capacity of 36 cubic feet per second (cfs). The open sections of the canal are at an elevation of about 5,400 ft.
Drum canal	Drum No. 1 and No.2	Drum Canal, situated between the Bear River and Highway 80, diverts water from Lake Spaulding 9.11 mi to Drum Forebay. The canal includes 7.14 mi of open ditch, 0.97 mi of flume, 0.65 mi of tunnel, and 0.35 mi of pipe. The width of the canal is 25 to 32 ft and depths are between 7.8 and 10 ft. The canal has a maximum flow capacity of 840 cfs. The canal has a maximum elevation of 4,800 ft and a minimum elevation of 4,750 ft.
Towle canal	Alta	Towle Canal diverts water from Canyon Creek, a tributary to North Fork American River, 3.88 mi to Alta Forebay. The canal includes an open ditch section that is 6 ft wide, 4.5 ft deep, and 3.28 mi long and a flume section that is 0.02 mi long. The system has a maximum flow capacity of 42 cfs. The elevation of the canal is about 3,550 ft.
South Yuba canal/Chalk Bluff	Deer Creek	The South Yuba Canal receives the water discharged from Spaulding No. 2 Powerhouse at the base of Lake Spaulding 15.71 mi to Big Tunnel. The canal includes 8.68 mi of open ditch, 5.56 mi of flume, 0.71 mi of tunnel, and 0.76 mi of pipe. The Chalk Bluff portion of the canal connects the downstream end of Big Tunnel 3.24 mi to Deer Creek Forebay and consists of 2.99 mi of open ditch, 0.20 mi of flume, and 0.05 mi of pipe. The maximum flow capacity of the system is 146-cfs at the upper end of the South Yuba Canal, dropping to 126-cfs below the Bear River spill gate. The Chalk Bluff portion of the system has a maximum flow capacity of 126 cfs and drops to 107 cfs at its terminus. The system has a maximum elevation of 4,900 ft and a minimum elevation of 4,470 ft.
Bear River canal	Halsey	The Bear River Canal diverts water from the Bear River Canal Diversion Dam 22.72 mi to Halsey Forebay. The canal includes 20.73 mi of open ditch, 0.67 mi of flume, and 1.32 mi of tunnel. The canal is 20 ft wide and 9 ft deep. The system has a maximum flow capacity of 490 cfs. The canal has a maximum elevation of 1,940 ft and a minimum elevation of 1,800 ft.

Table 3-196. Drum-Spaulding Project canals included in Fish Protection and Management during Canal Outages Plan. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Canal	Development	Facility Description
Upper Wise canal	Wise and Wise No.2	The Upper Wise Canal diverts water from Halsey Afterbay 2.18 mi to Rock Creek Reservoir. The canal includes 1.95 mi of open ditch, 0.06 mi of flume, and 0.17 mi of natural waterway. The canal is 22 ft wide and 8 ft deep. The system has a maximum flow capacity of 488 cfs. The canal has a maximum elevation of 1,820 ft and a minimum elevation of 1,440 ft.
Lower Wise canal	Wise and Wise No.2	The Lower Wise Canal diverts water from Rock Creek Reservoir 3.76 mi to Wise Forebay. The canal includes 3 mi of open ditch and 0.76 mi of tunnel. The canal is 22 ft wide and 8 ft deep. Its maximum flow capacity is 488 cfs. The canal has a maximum elevation of 1,430 ft and a minimum elevation of 1,390 ft.
South canal	Newcastle	The South Canal diverts water from Wise Powerhouse 5.35 mi to Newcastle Powerhouse. The canal includes 2.78 mi of open ditch, 0.40 mi of concrete box flume, and 1.04 mi of tunnel. The canal is 16 to 21 ft wide and 6 ft deep. The system has a maximum flow capacity of 450 cfs. The canal has a maximum elevation of 930 ft and a minimum elevation of 470 ft.

Table 3-197. Consistency between Forest Service condition 33 and PG&E's Integrated Vegetation Management Plan with regards to management of aquatic invasive species. (Source: adapted by staff from *PG&E Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; PG&E, August 30, 2012)

Forest Service's Condition	Integrated Vegetation Management Plan Provision	Page
<p>Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:</p> <ul style="list-style-type: none"> • Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site. • Removing visible plants, animals and mud from boat before leaving waterbody, • Cleaning and drying boats using California Fish and Wildlife accepted protocols for the prevention of all invasive aquatic species before entering any waterbody area • Disposing of unwanted bait in trash, including earthworms. • Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody. • Preventing spread of invasive species like amphibian chytrid fungus. 	<p>Licensee will implement a public education program, including signage at project's public boat access sites, and information on public web site(s) that the signs will refer to, covering the following prevention actions:</p> <ul style="list-style-type: none"> • Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site. • Removing visible plants, animals and mud from boat before leaving waterbody. • Cleaning and drying boats using California Fish and Wildlife accepted protocols for the prevention of all invasive aquatic species before entering any waterbody area • Disposing of unwanted bait in trash, including earthworms. • Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody. 	2-6
<p>If any reservoir access sites become infested with invasive aquatic species, licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.</p>	<p>If any reservoir access sites become infested with invasive aquatic species, licensee will consult with appropriate agencies, institute-appropriate signage, implement access restrictions and/or inspection and cleaning stations.</p>	2-6

Table 3-197. Consistency between Forest Service condition 33 and PG&E's Integrated Vegetation Management Plan with regards to management of aquatic invasive species. (Source: adapted by staff from *PG&E Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; PG&E, August 30, 2012)

Forest Service's Condition	Integrated Vegetation Management Plan Provision	Page
In accordance with California Assembly Bill 2065 (2008) (enacted <i>as</i> FGC §2302), project reservoirs will be assessed for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.	In accordance with Assembly Bill 2065 (enacted <i>as</i> FGC §2302), Project reservoirs will be assessed for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.	2-6
Invasive algae (<i>Didymosphenia geminata</i>) was found throughout the project area. If future studies document a safe method of reducing this invasive algae in rivers, licensee may be asked to implement this task in project-related locations	PG&E, in consultation with the Forest Service and BLM, will review, update, and/or revise the plan. as needed when significant changes in the existing condition occur.	5-3

Table 3-198. Yuba-Bear Project canals included in Fish Protection and Management during Canal Outages Plan. (Source: adapted by staff from PG&E 2011a and NID 2011a)

Canal	Development	Facility Description
Milton Bowman conduit	Bowman	Milton-Bowman conduit is totally enclosed and mostly underground, therefore, fish rescue prior to dewatering is not practical. The four penstocks are rarely dewatered, so fish rescue is not needed.
Bowman Spaulding conduit	Spaulding No. 3	Bowman-Spaulding Conduit conveys a maximum of 300 cubic feet per second (cfs) of water approximately 10.74 mile (mi) from the Bowman-Spaulding Diversion Dam at elevation 5,394 feet (ft) to Pacific Gas and Electric Company's (PG&E) Drum-Spaulding Project's Fuller Lake at elevation 5,342 ft, then southeast to the conduit's terminus at Spaulding No. 3 Powerhouse Penstock header box at elevation 5,325 ft. The conduit includes eight canal segments, one canal and flume segment, eight tunnels and one inverted siphon. The canal and flume segments total 6.74 mi (63%) of the total length of the conduit.
Dutch Flat no. 2 conduit	Dutch Flat No. 2	Dutch Flat No. 2 conduit is a combination of tunnel, flume, inverted siphon, and canal that diverts a maximum of 610 cfs of water from PG&E's Drum-Spaulding Project's Drum Afterbay approximately 4.68 mi to the Yuba-Bear Hydroelectric Project's Dutch Flat No. 2 Forebay. The conduit follows the Bear River along the north side of the Bear River canyon and generally maintains an elevation of approximately 3,330 ft. The conduit includes one flume segment and one canal segment. The canal and flume segments total 4.31 mi (92%) of the total length of the conduit.
Chicago Park conduit	Chicago Park	Chicago Park conduit diverts a maximum of 1.100 cfs of water from the Dutch Flat Afterbay 4.11 mi to the Chicago Park Forebay. The conduit parallels the Bear River along the north side of the canyon and generally maintains an elevation of approximately 2,780 ft. The conduit includes a concrete box bench flume segment and a gunite-lined canal. The canal and flume segments total 3.59 mi (87%) of the total length of the conduit.

Table 3-199. Consistency between Forest Service revised condition 33 and NID's Non-Native Invasive Species Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition 33	NID's Non-Native Invasive Species Management Plan	
	Wording in NID's Plan	Page Reference in NID's Plan
<p>Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:</p>	<p>Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:</p>	2-2 to 2-3
<ul style="list-style-type: none"> • Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site. • Removing visible plants, animals and mud from boat before leaving waterbody. • Cleaning and drying boats using California Fish and Wildlife accepted protocols for the prevention of all invasive aquatic species before entering any waterbody area • Disposing of unwanted bait in trash, including earthworms. • Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody. • Preventing spread of invasive species like amphibian chytrid fungus. 	<ul style="list-style-type: none"> • Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site. • Removing visible plants, animals and mud from boat before leaving waterbody. • Cleaning and drying boats using California Fish and Wildlife accepted protocols for the prevention of all invasive aquatic species before entering any waterbody area • Disposing of unwanted bait in trash, including earthworms. • Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody. 	
<p>If any reservoir access sites become infested with invasive aquatic species, licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.</p>	<p>If any reservoir access sites become infested with invasive aquatic species, licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.</p>	2-3

Table 3-199. Consistency between Forest Service revised condition 33 and NID's Non-Native Invasive Species Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition 33	NID's Non-Native Invasive Species Management Plan	
	Wording in NID's Plan	Page Reference in NID's Plan
In accordance with California Assembly Bill 2065 (2008) (enacted as FGC §23 02), project reservoirs will be assessed for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.	In accordance with Assembly Bill 2065, project reservoirs will be assessed for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.	2-3
Invasive algae (<i>Didymosphenia geminata</i>) was found throughout the Project area. If future studies document a safe method of reducing this invasive algae in rivers, licensee may be asked to implement this task in project-related locations.	NID, in consultation with the Forest Service and BLM, will review, update, and/or revise the plan as needed when significant changes in the existing condition occur.	5-2

Table 3-200. Consistency between Forest Service revised condition 34 (Vegetation and Non-Native Invasive Plant Management Plan) and NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition No. 34 (Vegetation and Non-Native Invasive Plant Management Plan)	NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan	
	Section in NID's Plan	Page Reference in NID's Plan
Special status species management: protection, monitoring, frequency of surveys, internal education, reporting, and adaptive management.	Vegetation Management Plan Section 4.0: Sensitive Area Protection	4-1 to 4-3
Sensitive area protection, including guidelines for conducting activities that reduce the effects to sensitive resources.	Vegetation Management Plan Section 4.0: Sensitive Area Protection	4-1 to 4-3
Non-native invasive plant (NNIP) species management: frequency of surveys, guidelines for prevention, treatment, internal education, monitoring, reporting, guidelines for conducting weed risk assessment for new project feature development, including an adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.	Non-Native Invasive Plant Plan	
	Section 3: NNIP Surveys and Monitoring	3-1 2-1 to 2-2 4-1 to 4-5
	Section 2.2: NNIP Prevention Guidelines	
	Section 4: NNIP Treatment	2-1
	Section 2.1: Annual Training	3-1
	Section 3: NNIP Surveys and Monitoring	5-1 to 5-2
	Section 5.2: Reporting	2-2 to 2-3
	Section 2.3: Aquatic Invasive Species Guidelines	
	Vegetation Management Plan	
Methods that ensure early detection and treatment of non-native invasive plants.	Section 2.0: Revegetation	2-1 to 2-5
	Non-Native Invasive Plant Plan	3-1
Guidelines for conducting licensee's	Section 3: NNIP Surveys and Monitoring	
	Non-Native Invasive Plant Plan	2-1 to 2-2

Table 3-200. Consistency between Forest Service revised condition 34 (Vegetation and Non-Native Invasive Plant Management Plan) and NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition No. 34 (Vegetation and Non-Native Invasive Plant Management Plan)	NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan	
	Section in NID's Plan	Page Reference in NID's Plan
inspections of equipment and vehicle for non-native invasive plants.	Section 2.2: NNIP Prevention Guidelines	
Revegetation implementation and monitoring.	Vegetation Management Plan Section 2.0: Revegetation	2-1 to 2-5
Treatment protocols for vegetation management, hazardous fuels reduction, and hazard tree management for protection of Project facilities and Project-affected resources within the Project affected area.	Vegetation Management Plan Section 3.0: Vegetation Management	3-1 to 3-5

Table 3-200. Consistency between Forest Service revised condition 34 (Vegetation and Non-Native Invasive Plant Management Plan) and NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition No. 34 (Vegetation and Non-Native Invasive Plant Management Plan)	NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan	
	Section in NID's Plan	Page Reference in NID's Plan
Pesticide/herbicide use approval and restrictions.	Vegetation Management Plan “The Licensee will implement the following guidelines when the use of pesticides on federally managed lands is proposed. Licensee will acquire the necessary permission from the federal agency prior to applying pesticides on federally managed lands. When permission is obtained, pesticide use will be in compliance with agency standards. On federal lands, Licensee shall use only those materials registered by the United States Environmental Protection Agency (EPA) for the specific purpose planned. Only those herbicides approved for use on BLM lands will be applied to BLM lands. In addition, a Pesticide Use Proposal must be approved by the BLM prior to the use of pesticides on BLM lands. Licensee shall strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. Any pesticide application that is deemed necessary within areas with special resources will likely have additional requirements.”	3-1
Habitat management for specific special-status wildlife species.	Vegetation Management Plan Section 4.0: Sensitive Area Protection	4-1 to 4-3

Table 3-200. Consistency between Forest Service revised condition 34 (Vegetation and Non-Native Invasive Plant Management Plan) and NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan. (Source: adapted by staff from *NID Alternative Conditions for Preliminary Section 4(e) Conditions submitted by Forest Service*; NID, August 30, 2012)

Forest Service Revised Condition No. 34 (Vegetation and Non-Native Invasive Plant Management Plan)	NID's Non-Native Invasive Species Management Plan and Vegetation Management Plan	
	Section in NID's Plan	Page Reference in NID's Plan
Annual reporting guidelines for the Annual Meeting.	Non-Native Invasive Plant Plan	5-1 to 5-2 (both plans)
	Section 5.1: Annual Consultation Meeting	
	Section 5.2: Reporting	
	Vegetation Management Plan	
	Section 5.1: Annual Consultation Meeting	
	Section 5.2: Reporting	

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Appendix B

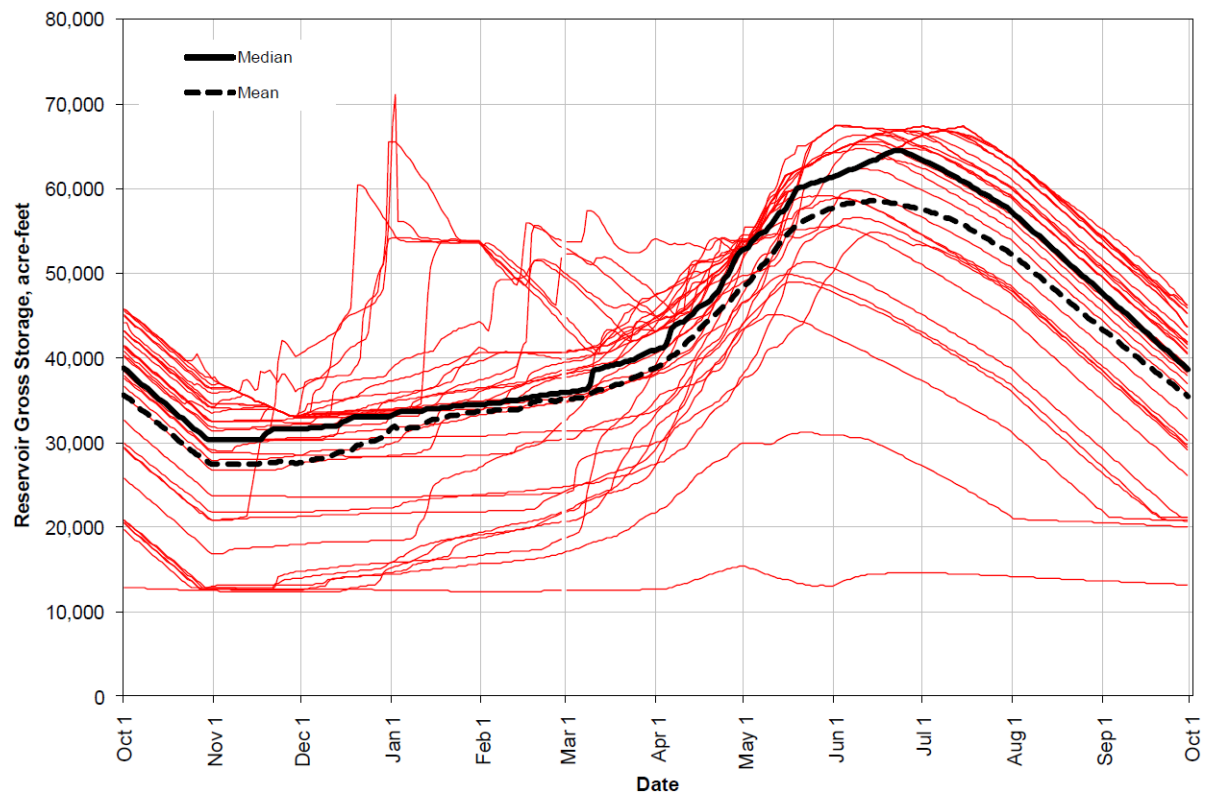
Aquatic Resources Figures

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Appendix B-1

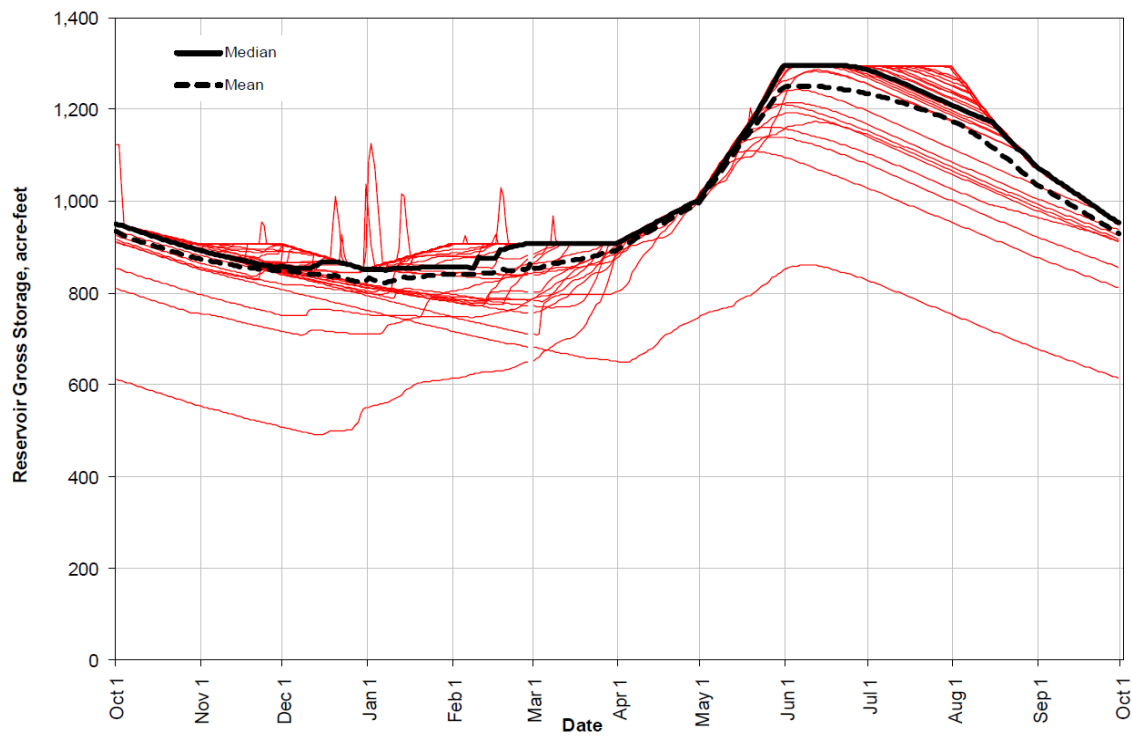
Aquatic Resources Figures: Affected Environment

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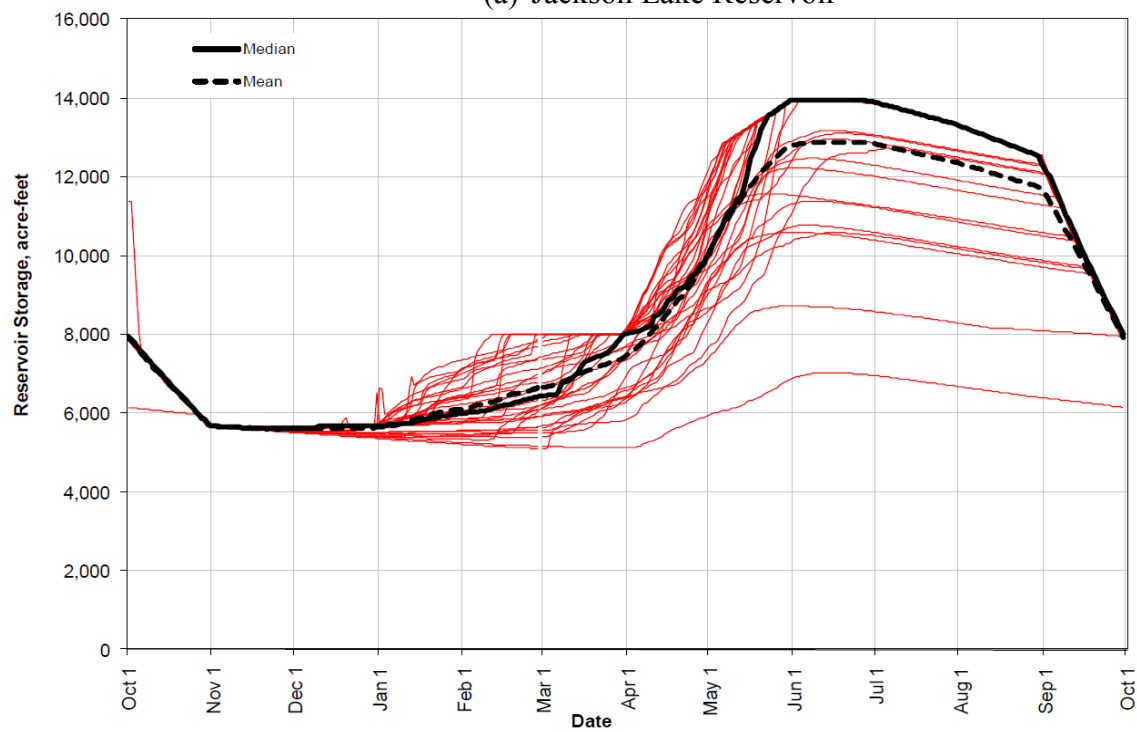


(a) Jackson Meadows Reservoir

Figure 3-3. Historic trends in seasonal reservoir storage – Middle Yuba River Sub-Basin. (Source: NID 2011a)

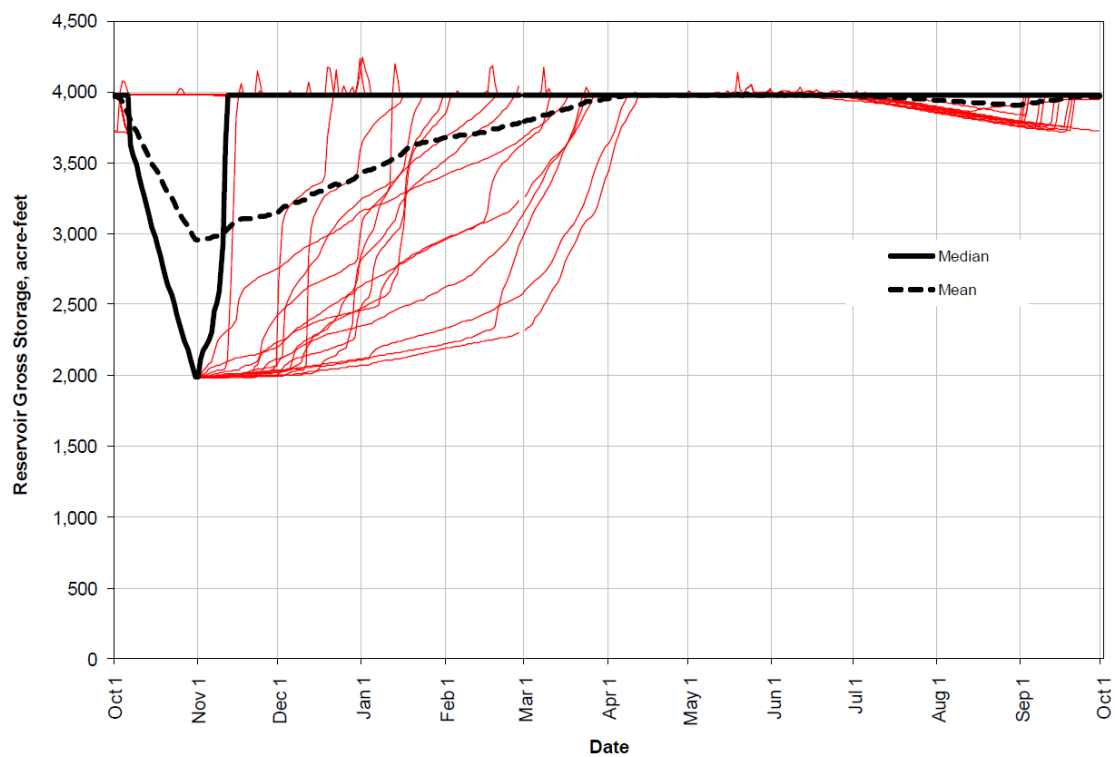


(a) Jackson Lake Reservoir

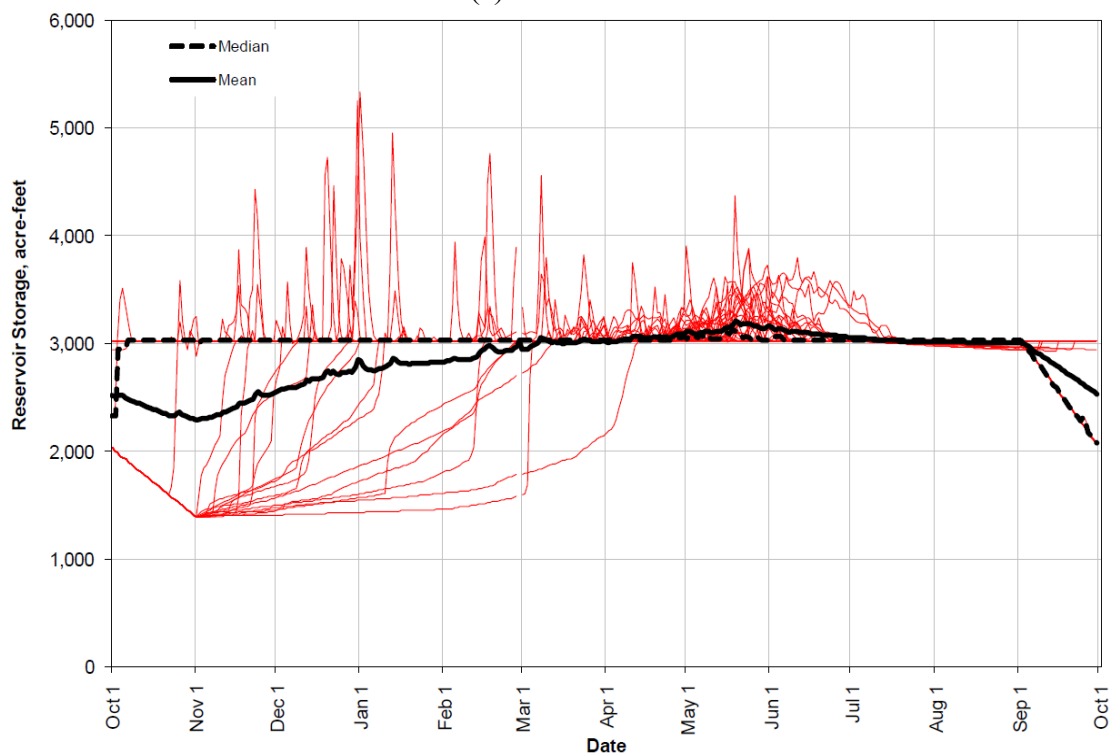


(b) French Lake Reservoir

Figure 3-4. Historic trends in seasonal reservoir storage – Canyon Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

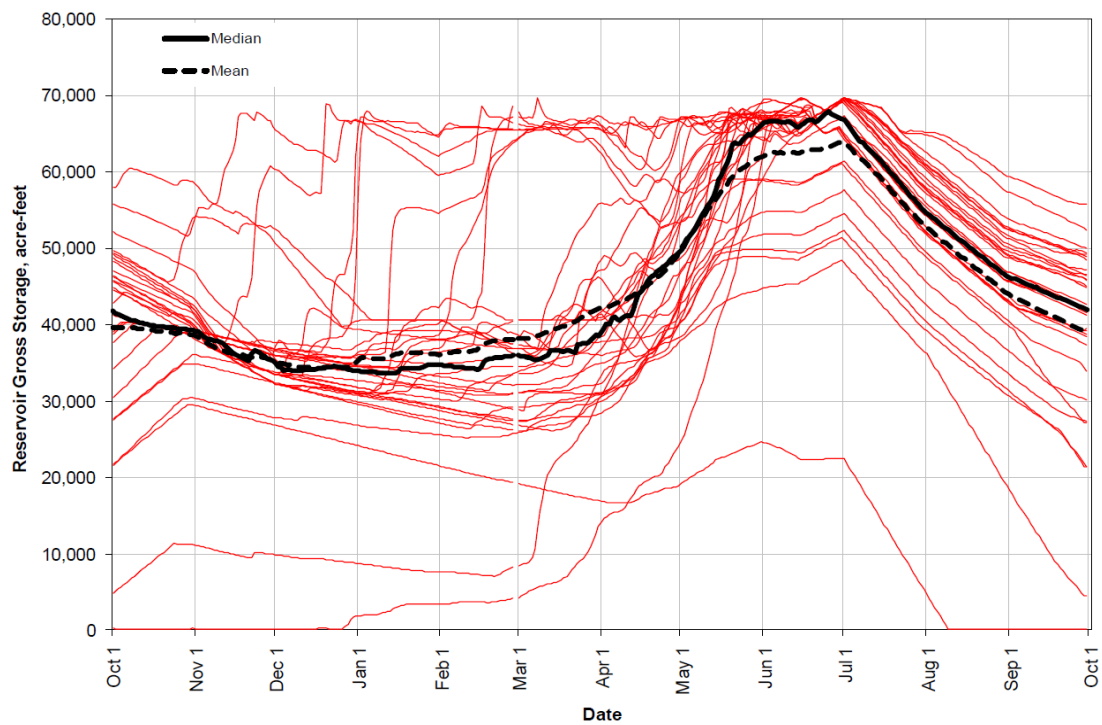


(a) Faucherie Lake Reservoir

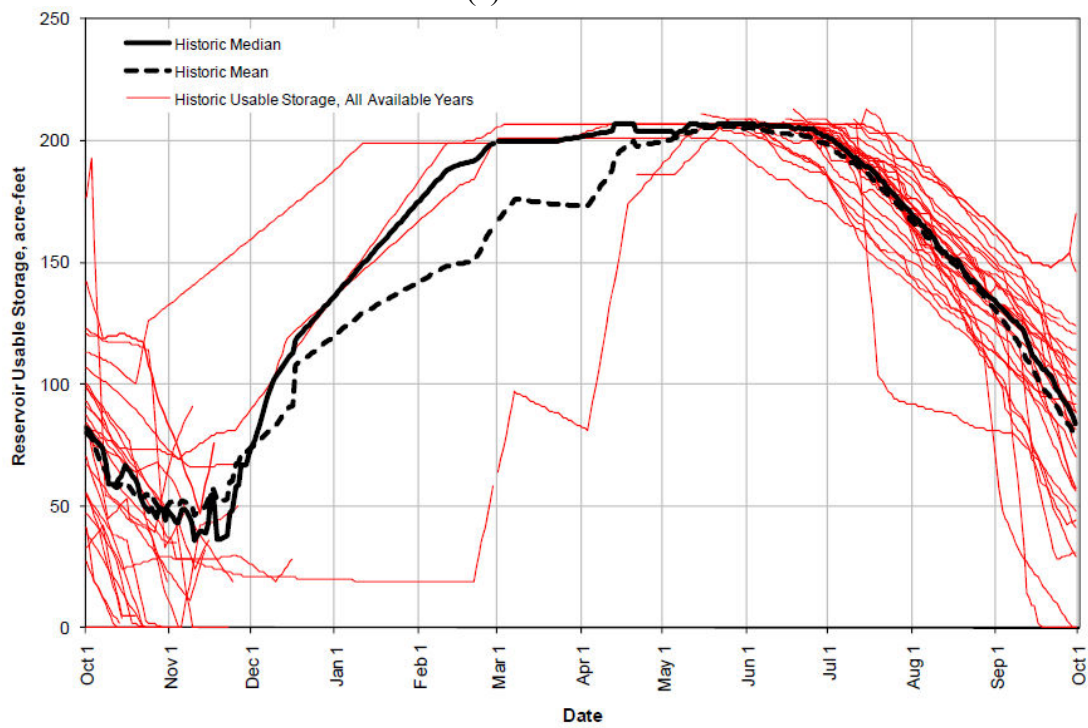


(b) Sawmill Lake Reservoir

Figure 3-5. Historic trends in seasonal reservoir storage – Canyon Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

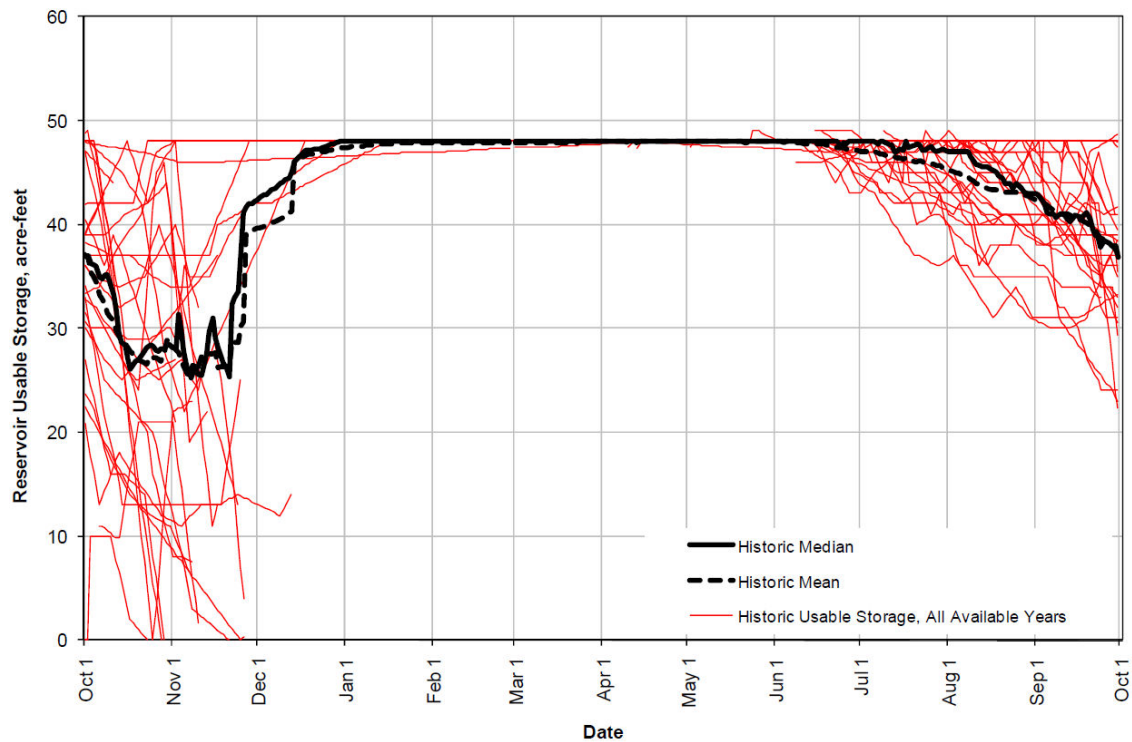


(a) Bowman Lake Reservoir

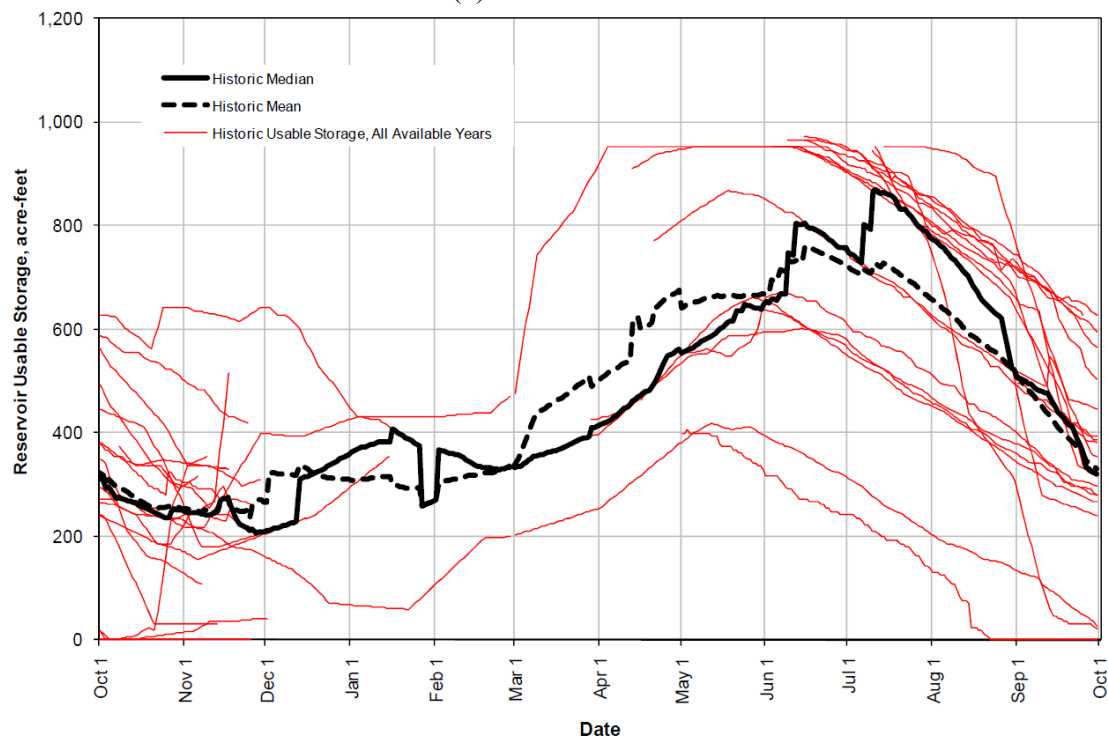


(b) Upper Rock Lake Reservoir

Figure 3-6. Historic trends in seasonal reservoir storage – Canyon Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

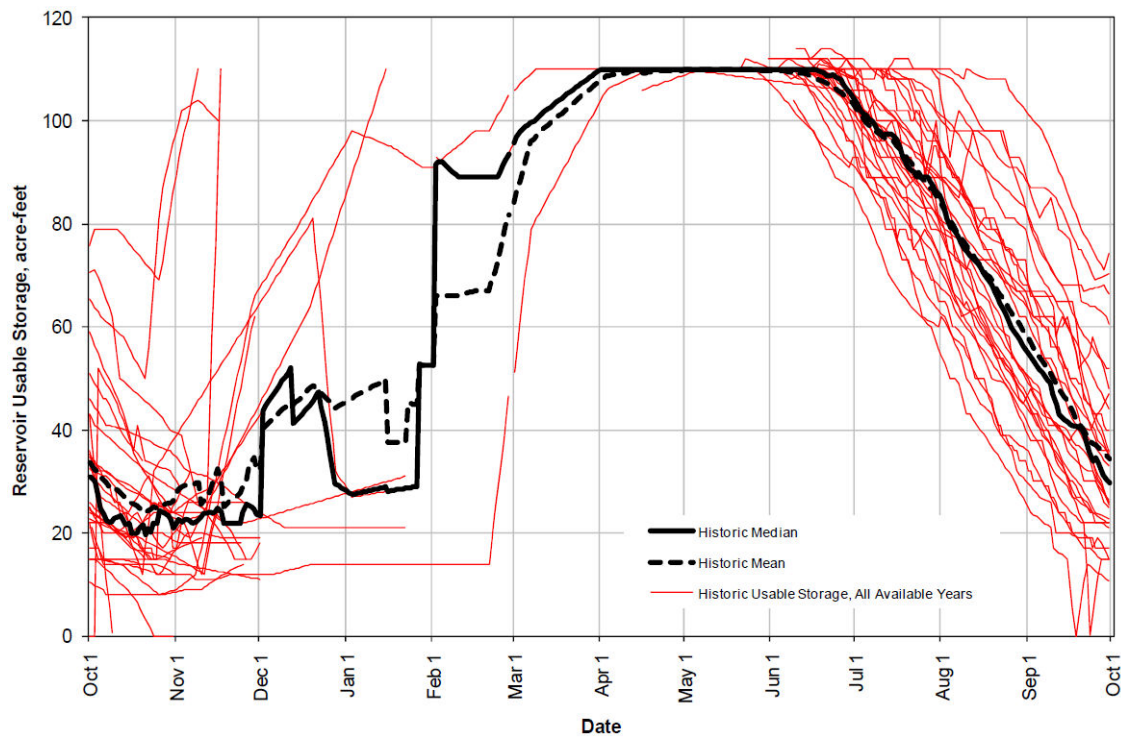


(a) Lower Rock Lake Reservoir

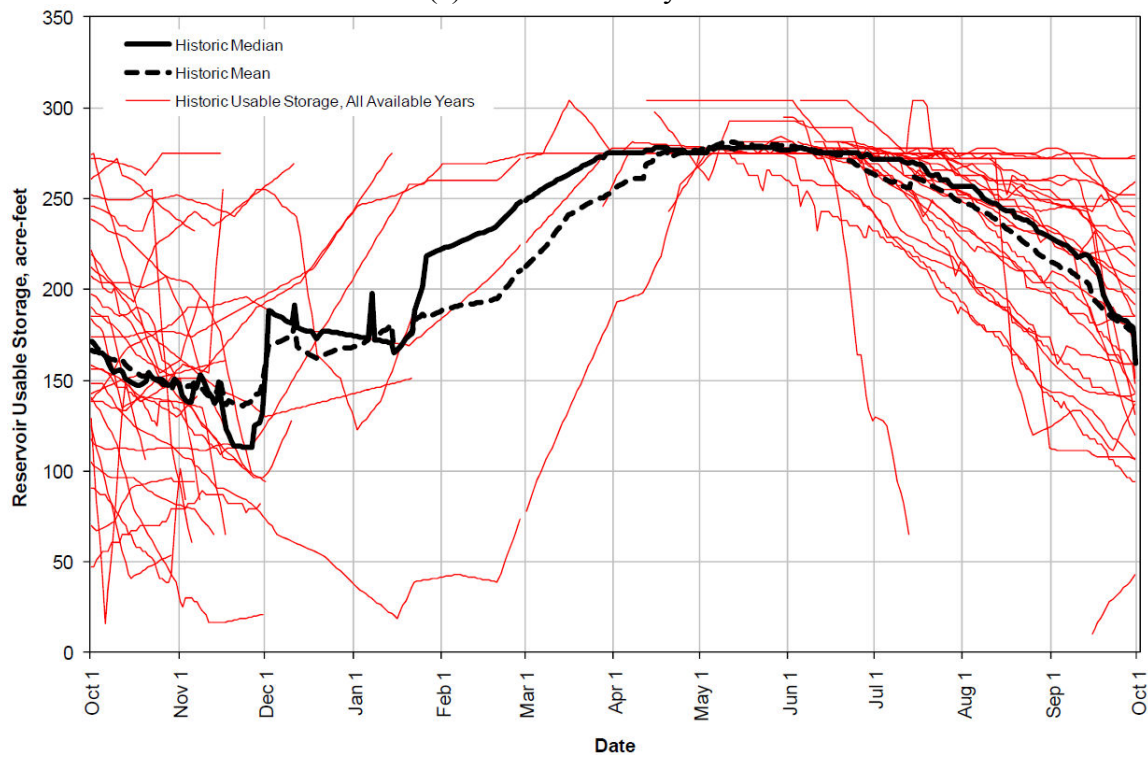


(b) Culberston Lake Reservoir

Figure 3-7. Historic trends in seasonal reservoir storage – Canyon Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

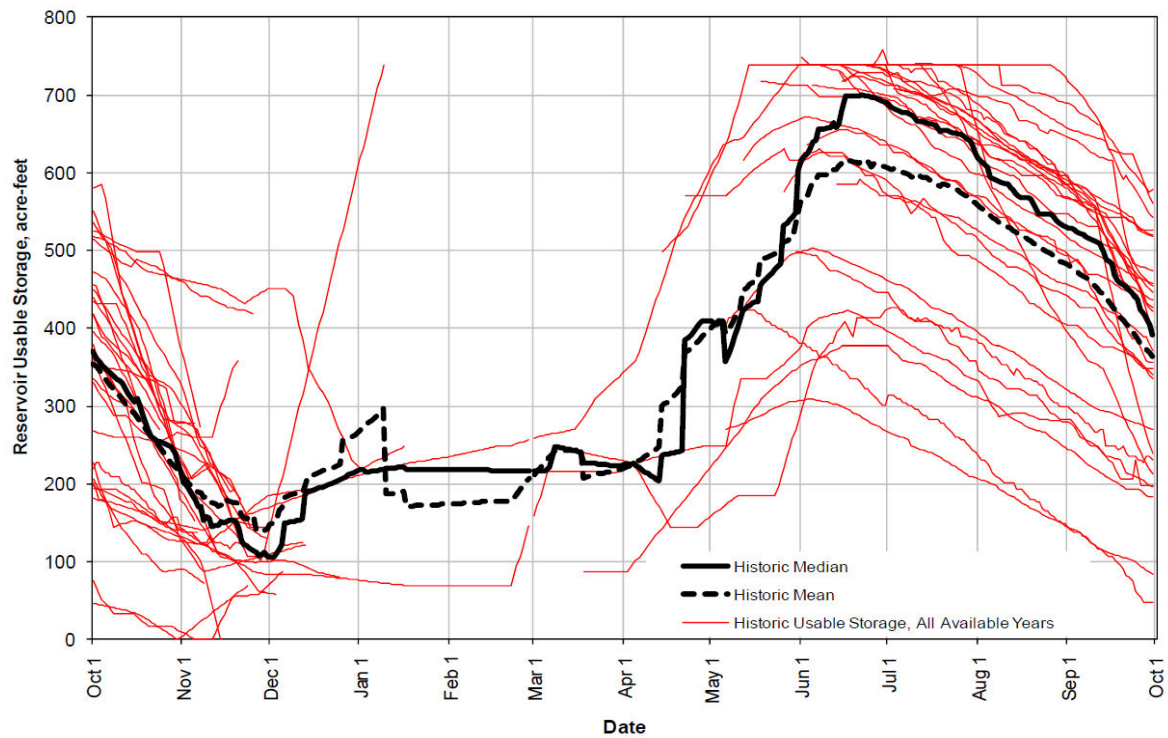


(a) Middle Lindsey Lake Reservoir

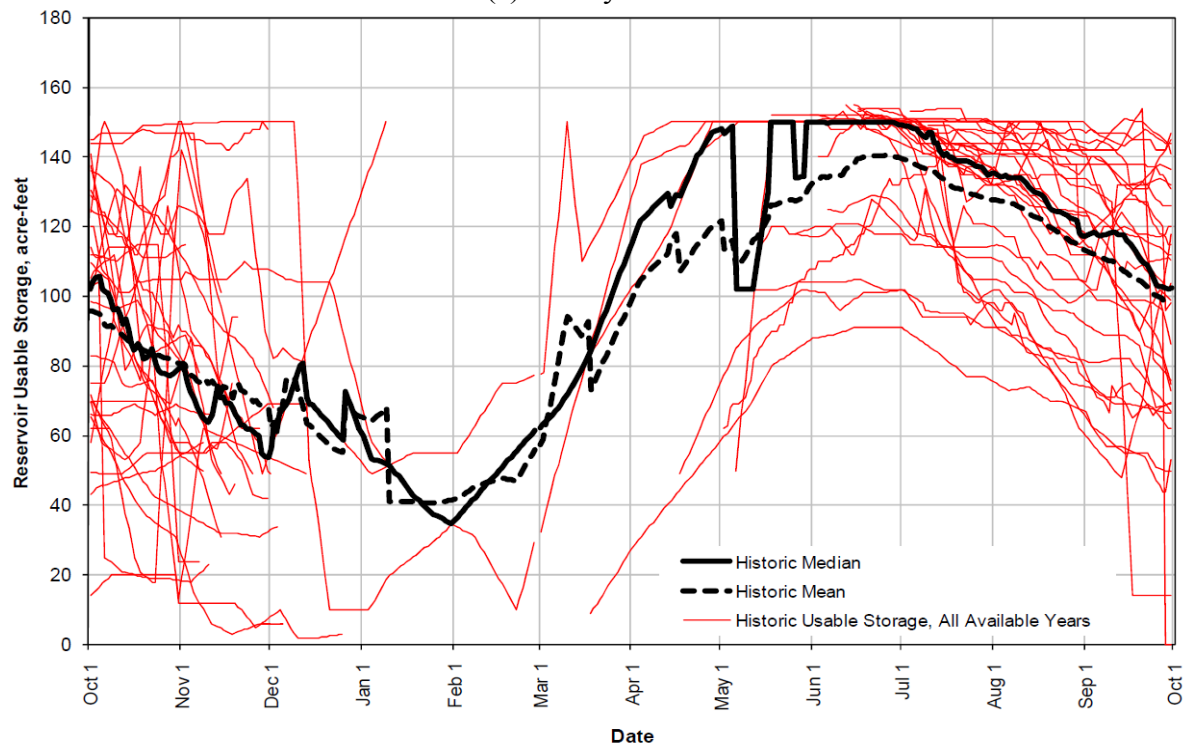


(b) Lower Lindsey Lake Reservoir

Figure 3-8. Historic trends in seasonal reservoir storage – Canyon Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

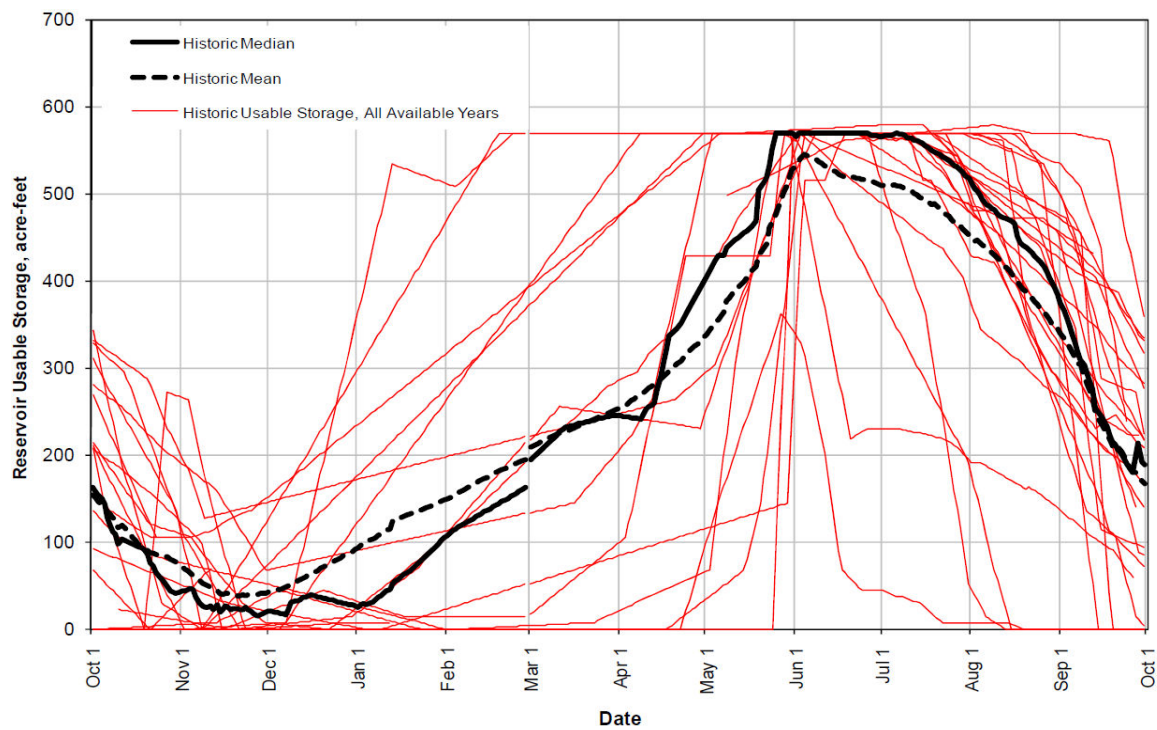


(a) Feeley Lake Reservoir

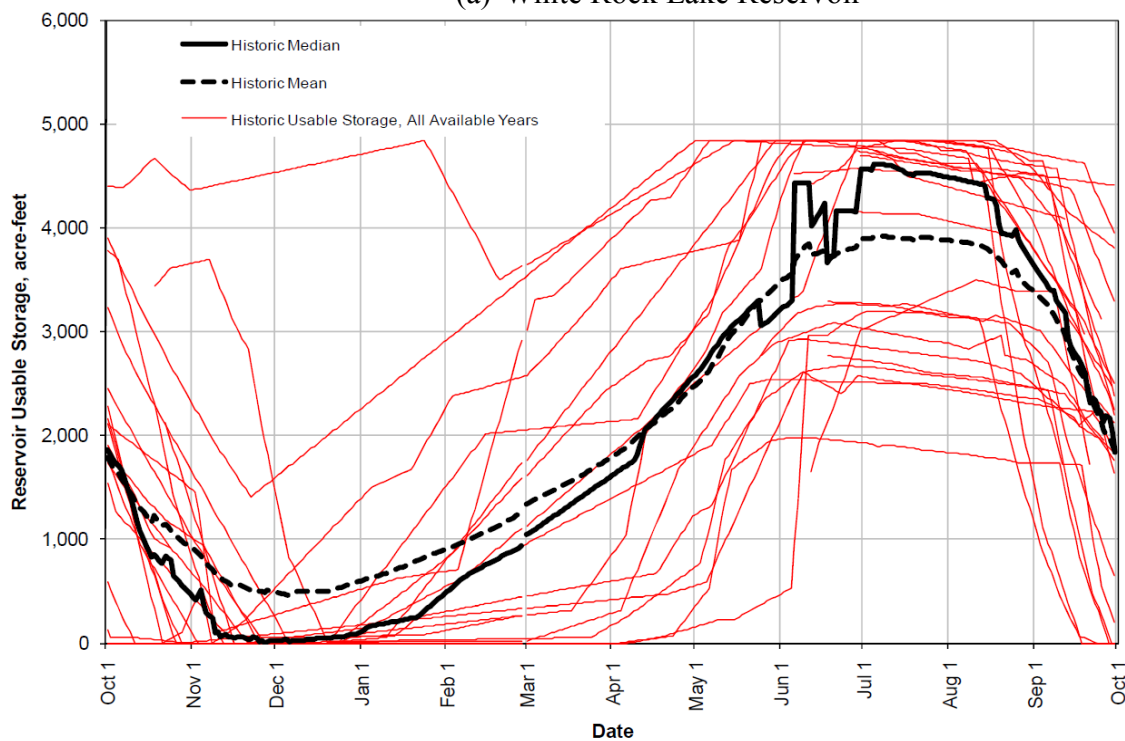


(b) Carr Lake Reservoir

Figure 3-9. Historic trends in seasonal reservoir storage – Fall Creek Sub-Basin. (Source: PG&E 2011a; NID 2011a)

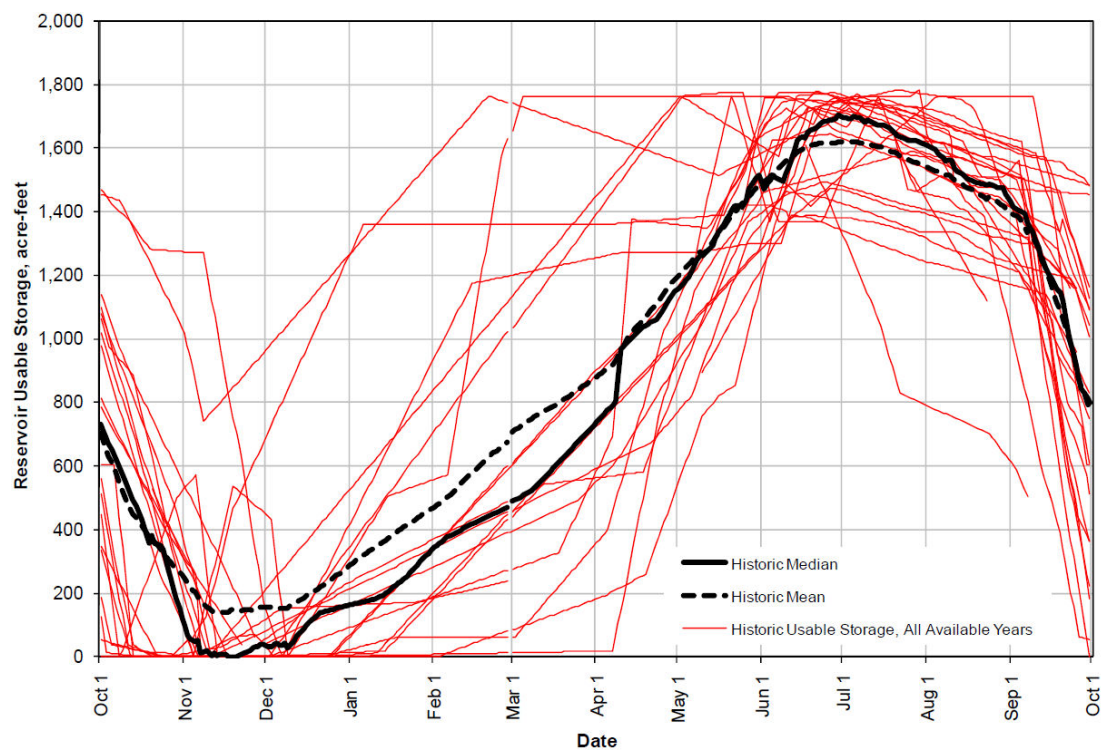


(a) White Rock Lake Reservoir

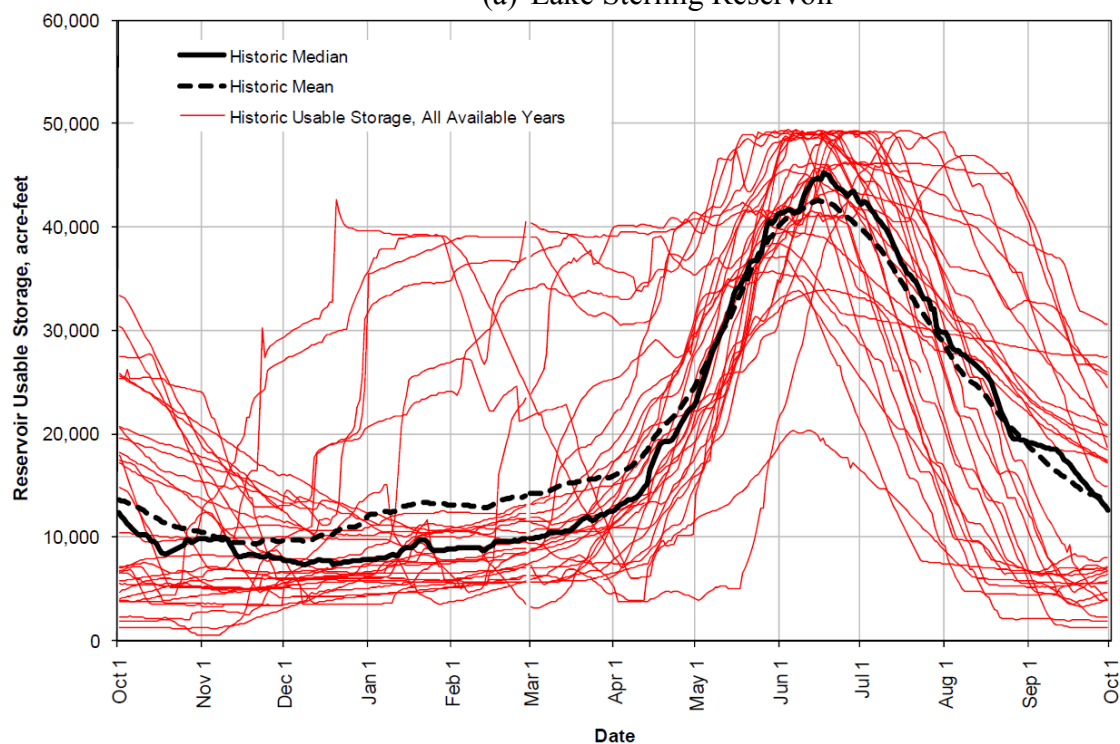


(b) Meadow Lake Reservoir

Figure 3-10. Historic trends in seasonal reservoir storage – South Yuba River Sub-Basin. (Source: PG&E 2011a; NID 2011a)

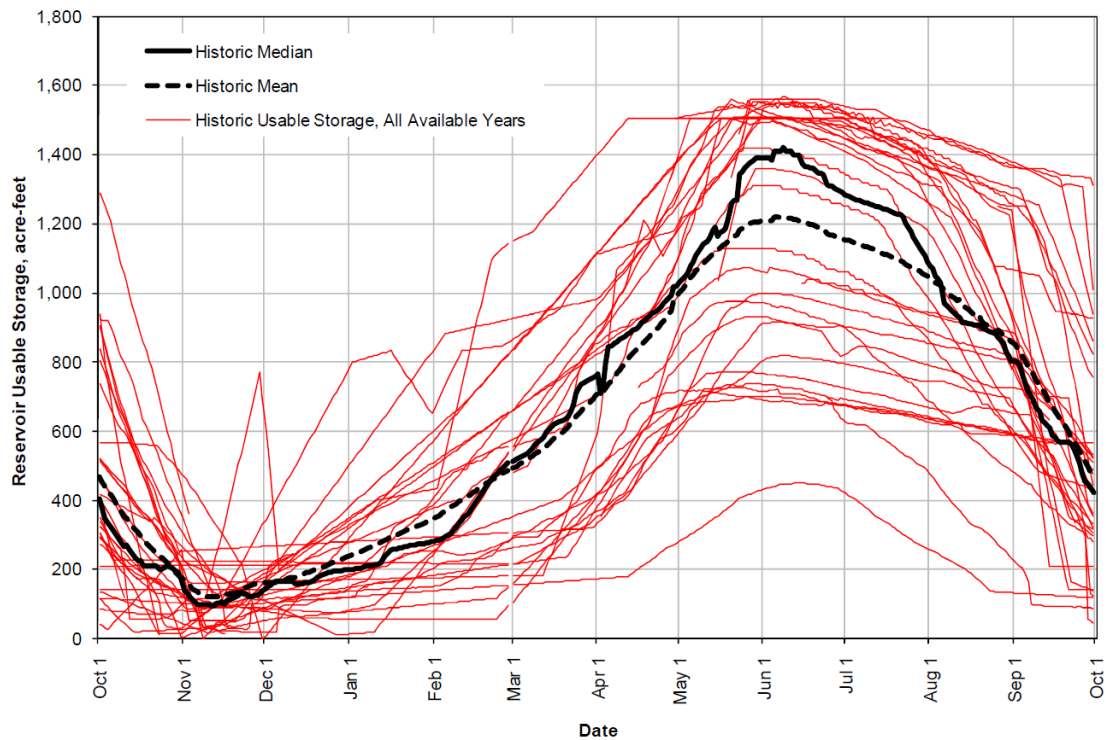


(a) Lake Sterling Reservoir

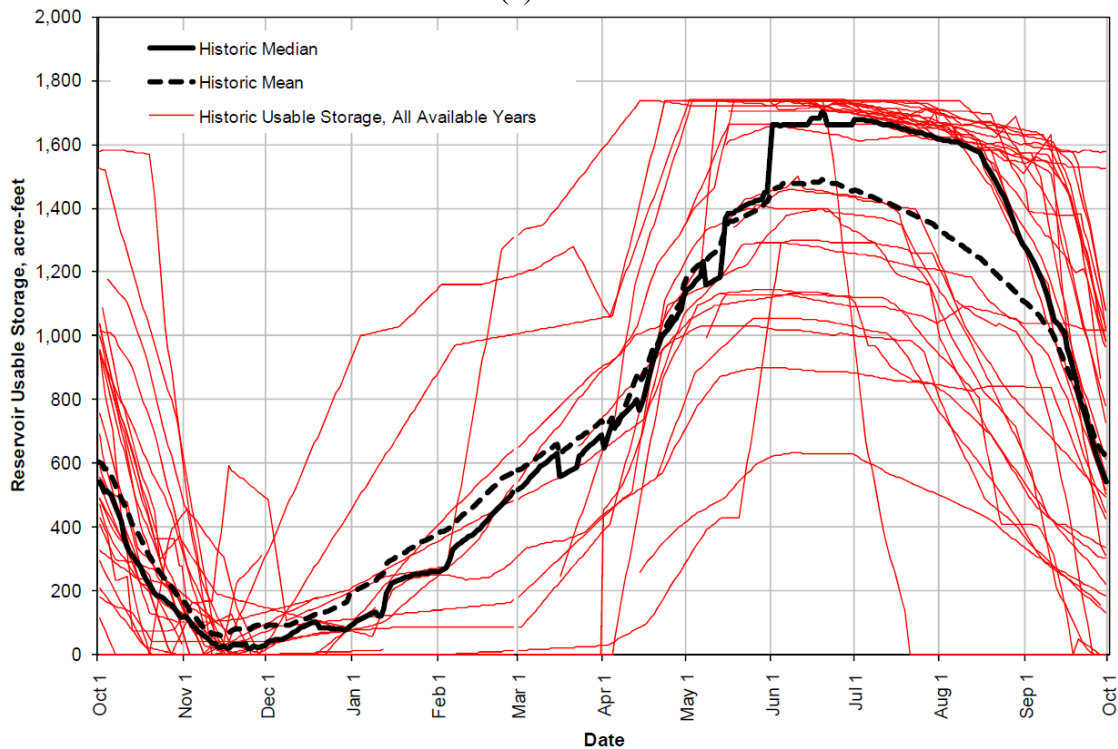


(b) Fordyce Lake Reservoir

Figure 3-11. Historic trends in seasonal reservoir storage – South Yuba River Sub-Basin. (Source: PG&E 2011a; NID 2011a)

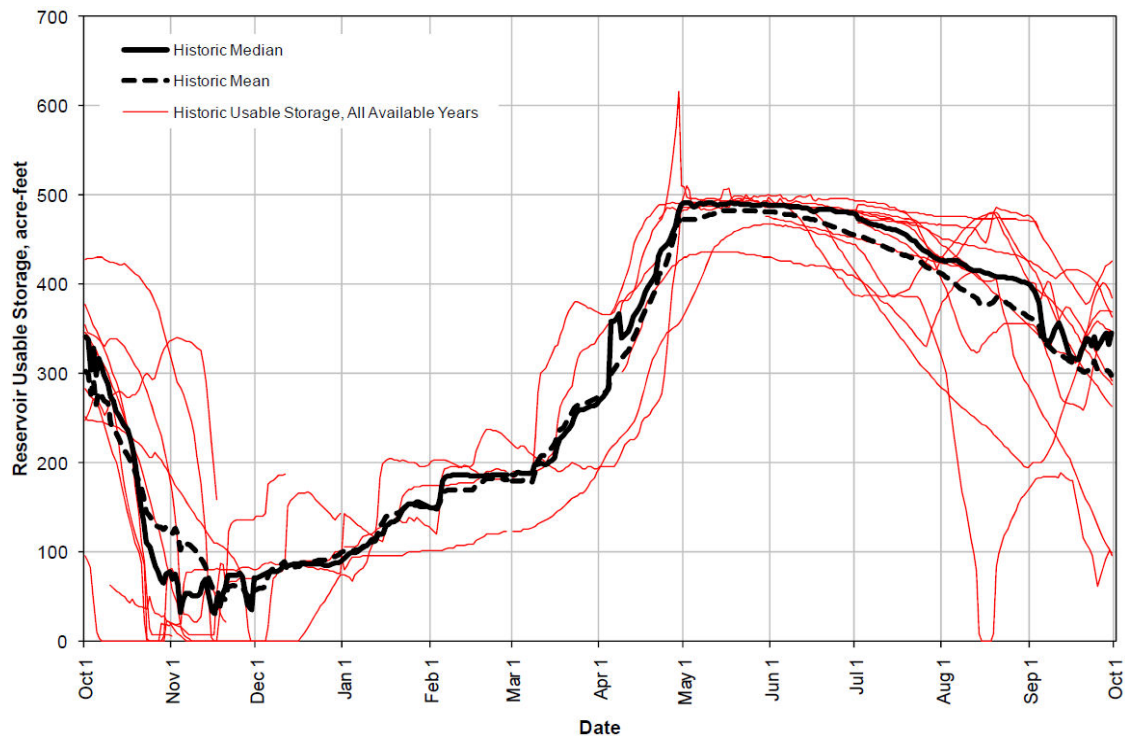


(a) Kidd Lake Reservoir

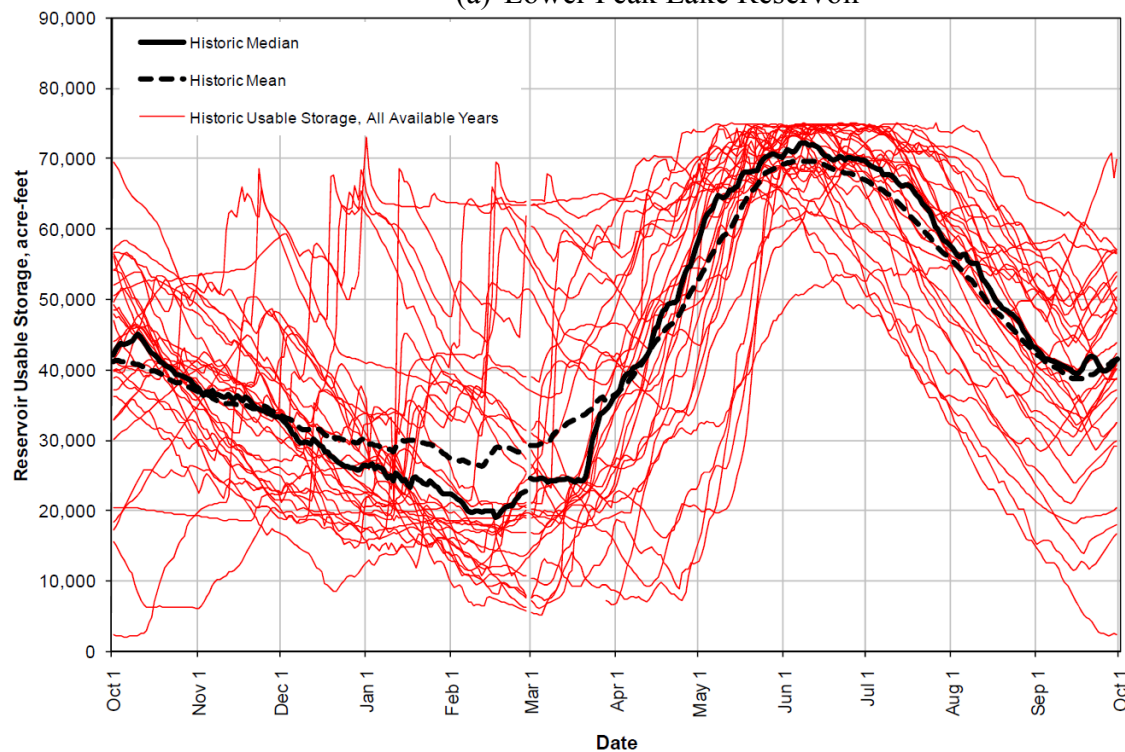


(b) Upper Peak Lake Reservoir

Figure 3-12. Historic trends in seasonal reservoir storage – South Yuba River Sub-Basin. (Source: PG&E 2011a; NID 2011a)

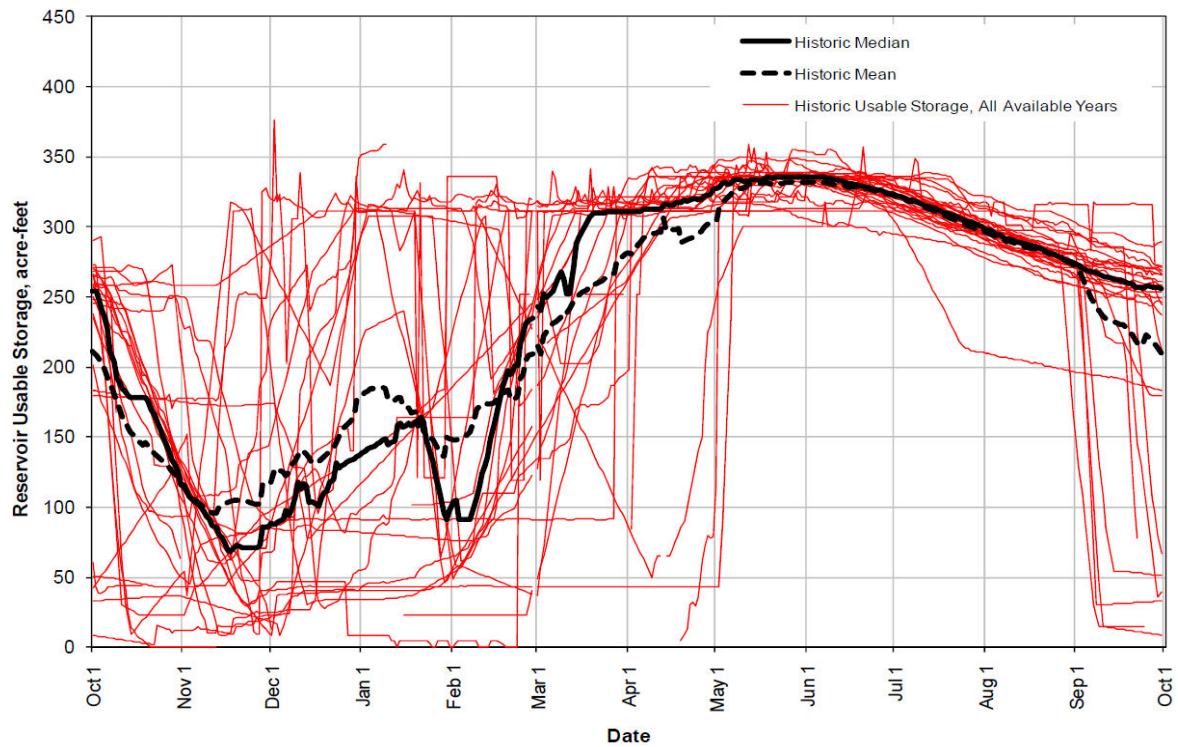


(a) Lower Peak Lake Reservoir

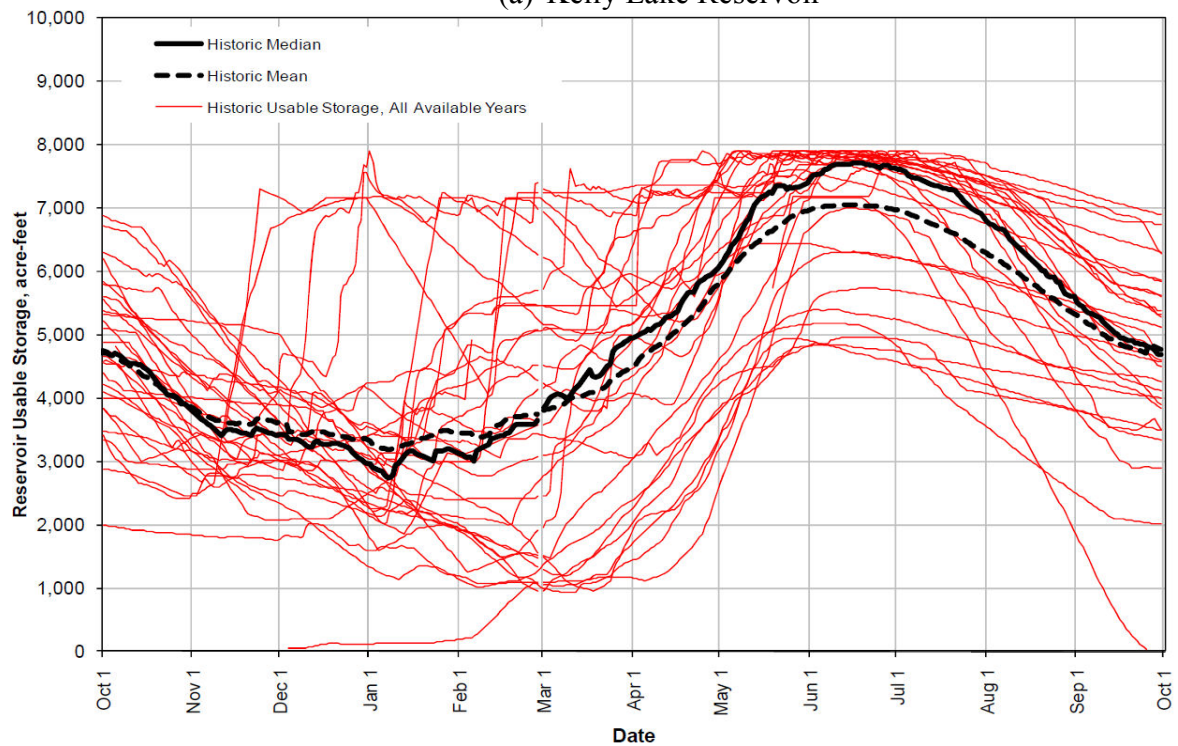


(b) Lake Spaulding Reservoir

Figure 3-13. Historic trends in seasonal reservoir storage – South Yuba River Sub-Basin. (Source: PG&E 2011a; NID 2011a)

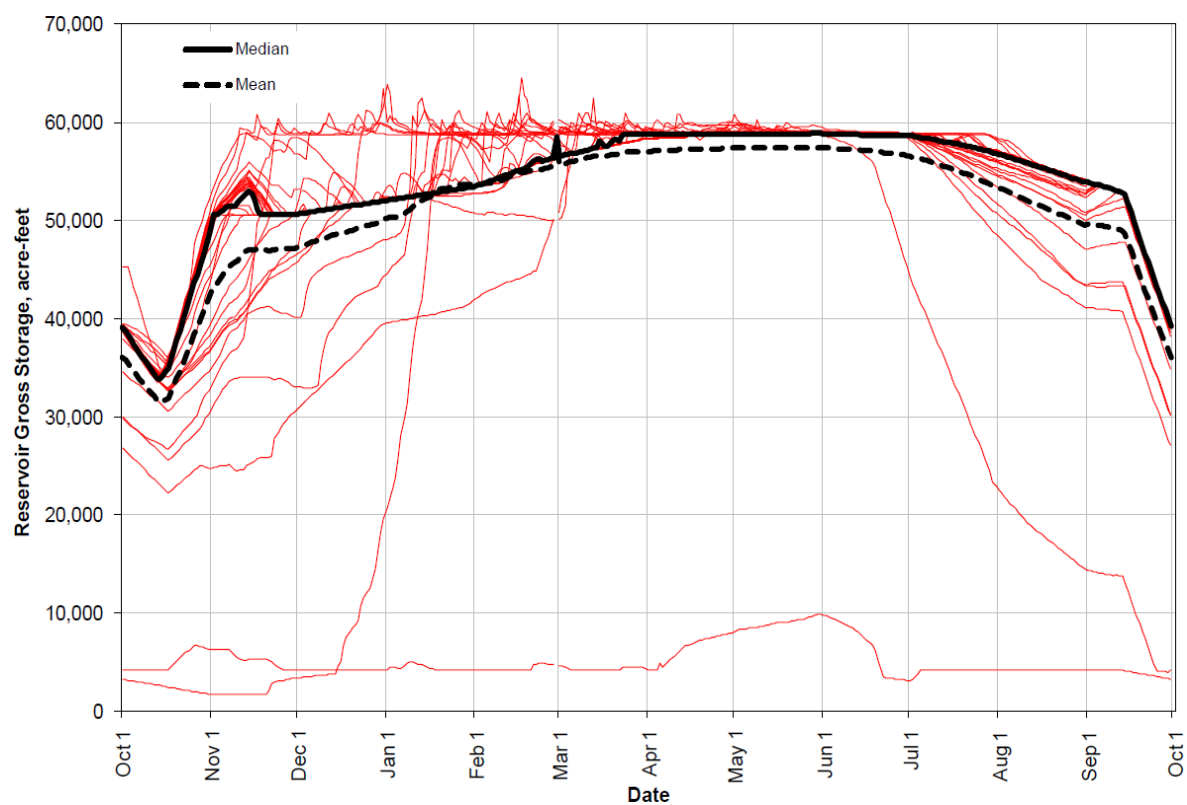


(a) Kelly Lake Reservoir



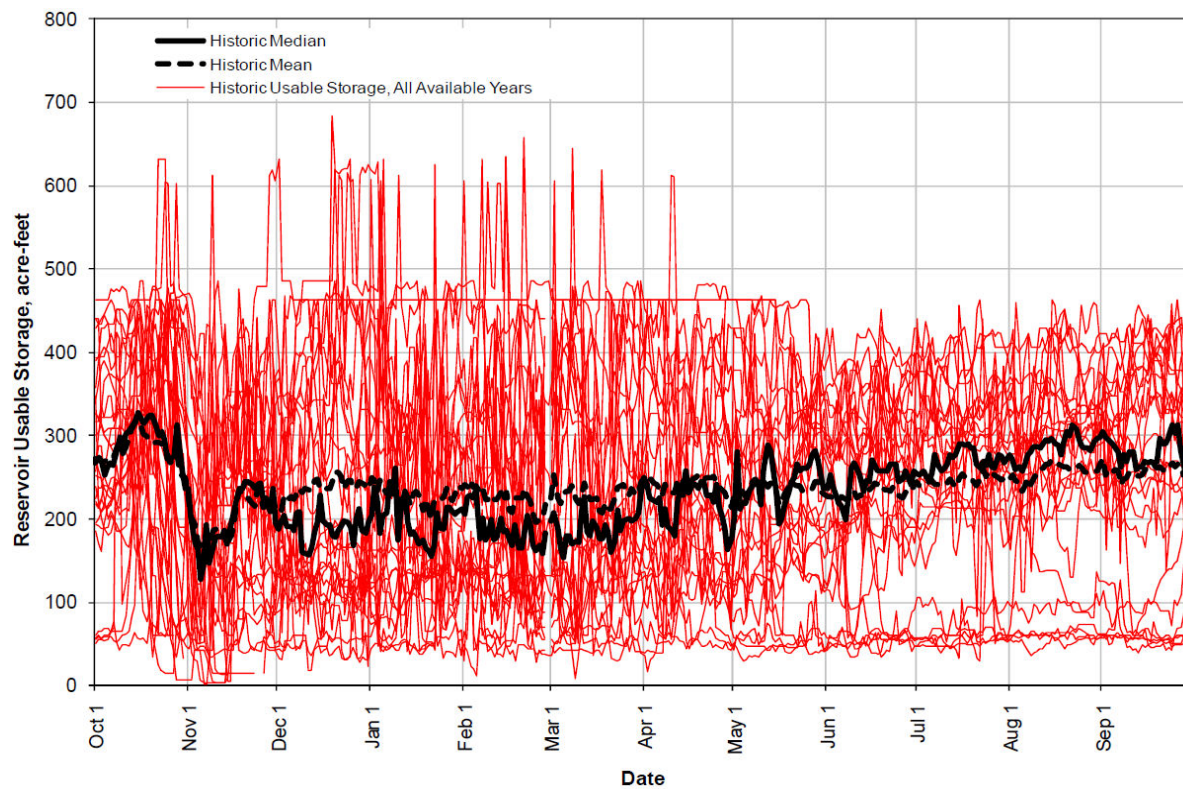
(b) Lake Valley Reservoir

Figure 3-14. Historic trends in seasonal reservoir storage – North Fork of American River Sub-Basin. (Source: PG&E 2011a; NID 2011a)



(a) Rollins Reservoir

Figure 3-15. Historic trends in seasonal reservoir storage – Bear River Sub-Basin. (Source: PG&E 2011a; NID 2011a)



(a) Rock Creek Reservoir

Figure 3-16. Historic trends in seasonal reservoir storage – Mormon Ravine Sub-Basin. (Source: PG&E 2011a; NID 2011a)

Appendix B-2

Aquatic Resources Figures: Environmental Effects

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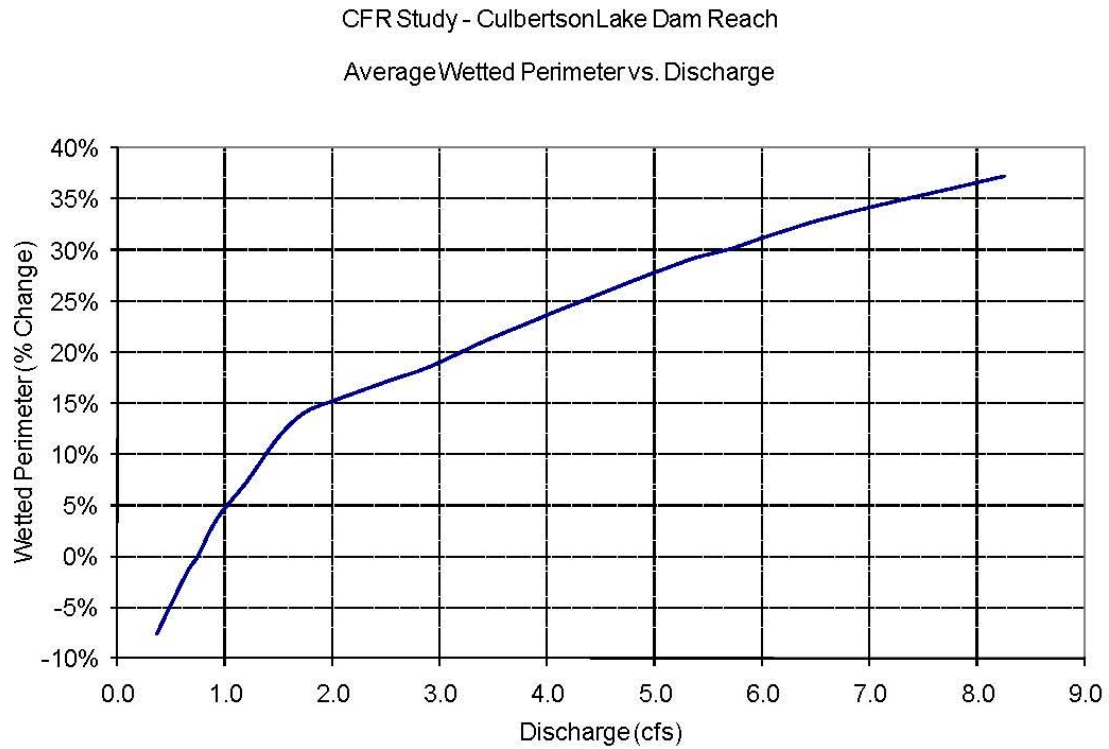


Figure 3-17. Percent change in wetted perimeter as a function of discharge in unnamed tributary below Culbertson Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

CFR Study - Middle Lindsey Lake Dam Reach
Average Wetted Perimeter vs. Discharge

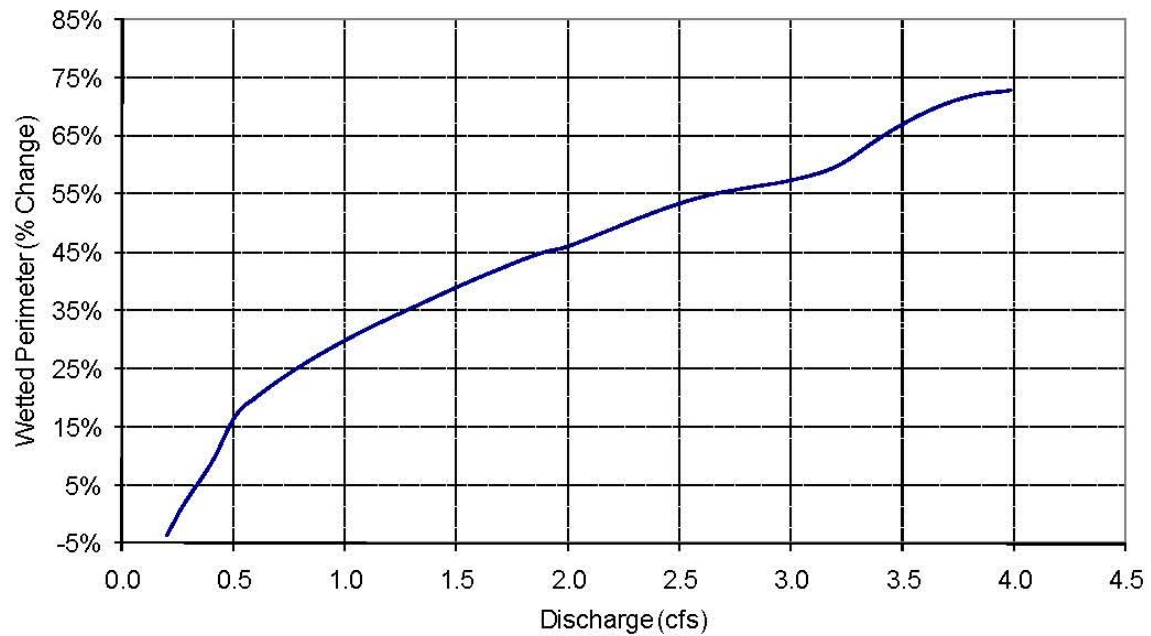


Figure 3-18. Percent change in wetted perimeter as a function of discharge in Lindsey Creek below Middle Lindsey Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

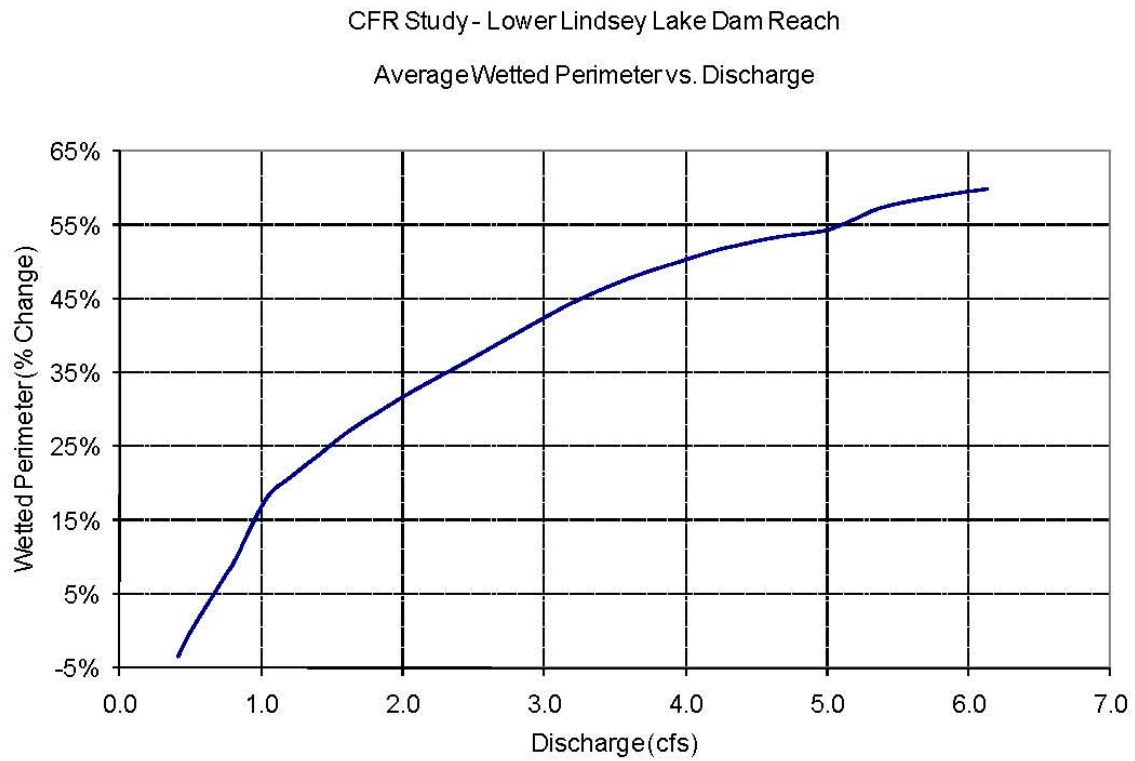


Figure 3-19. Percent change in wetted perimeter as a function of discharge in Lindsey Creek below Lower Lindsey Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

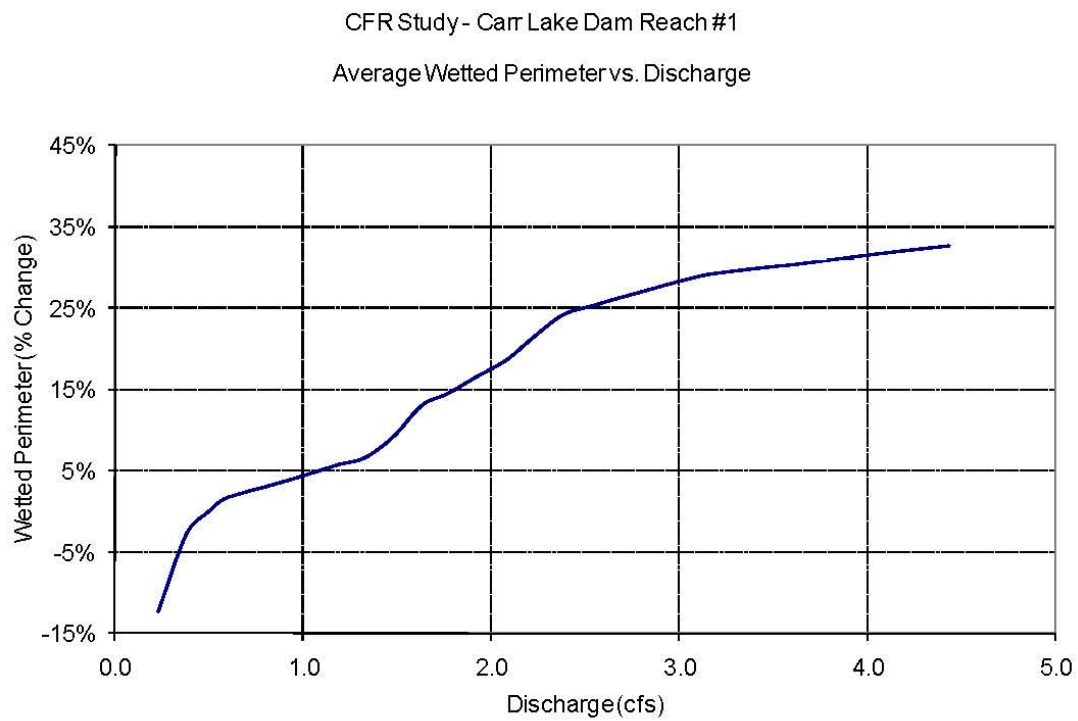


Figure 3-20. Percent change in wetted perimeter as a function of discharge in Lake Creek study stream reach #1 below Carr Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

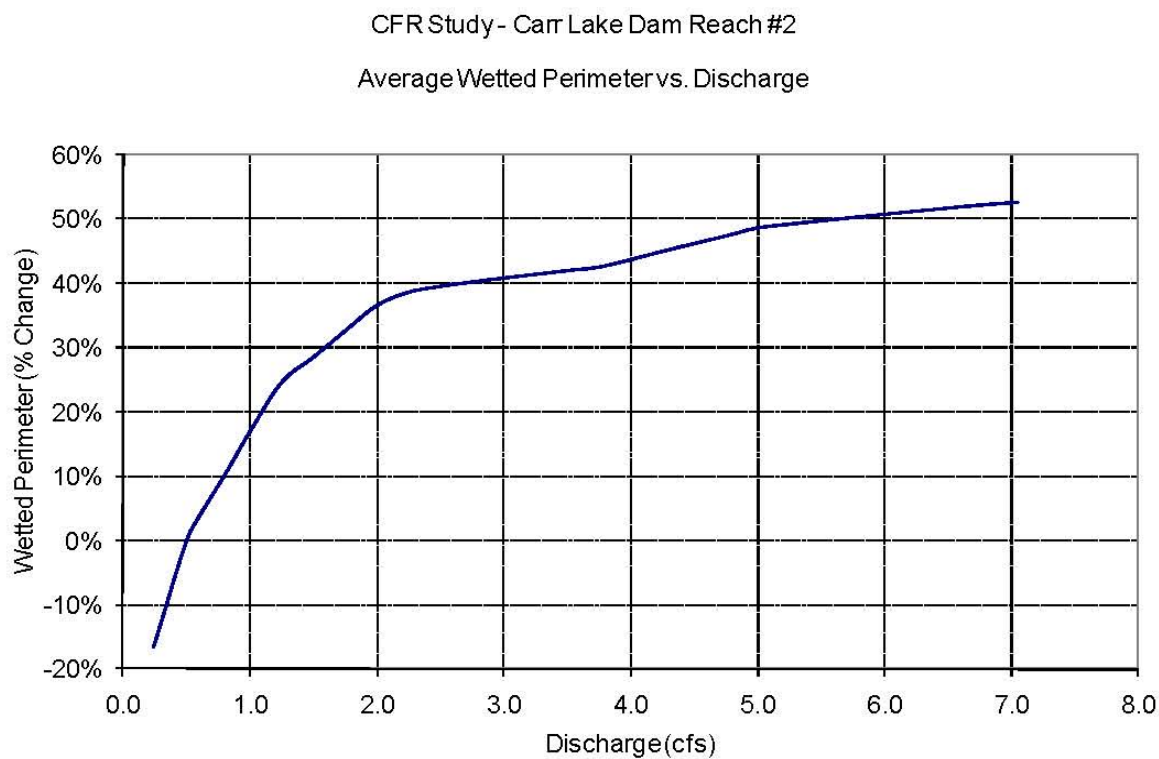


Figure 3-21. Percent change in wetted perimeter as a function of discharge in Lake Creek study stream reach #2 below Carr Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

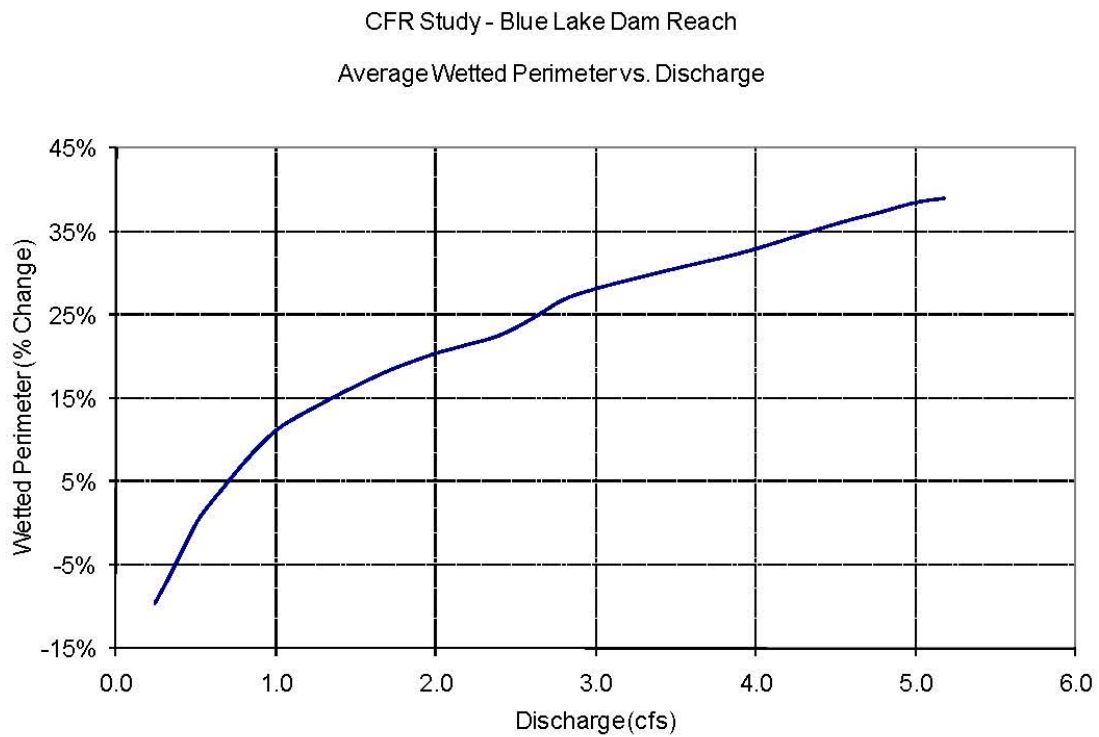


Figure 3-22. Percent change in wetted perimeter as a function of discharge in Rucker Creek below Blue Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

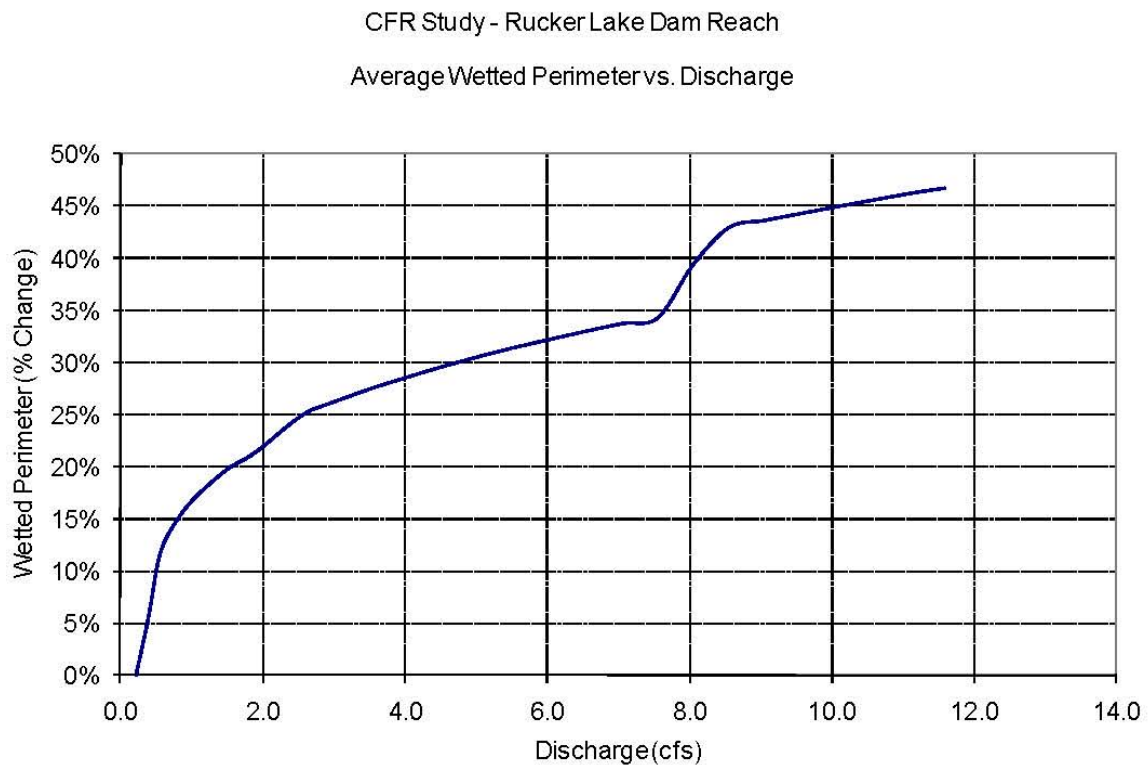


Figure 3-23. Percent change in wetted perimeter as a function of discharge in Rucker Creek below Rucker Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

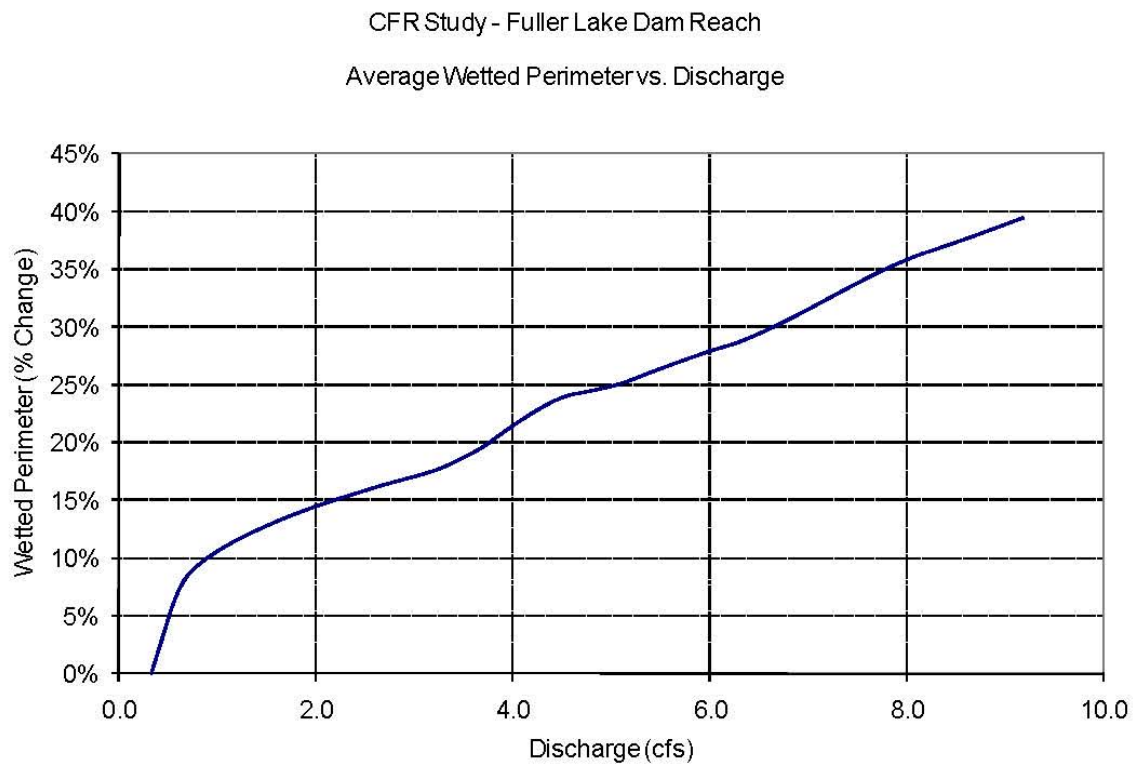


Figure 3-24. Percent change in wetted perimeter as a function of discharge in unnamed tributary below Fuller Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

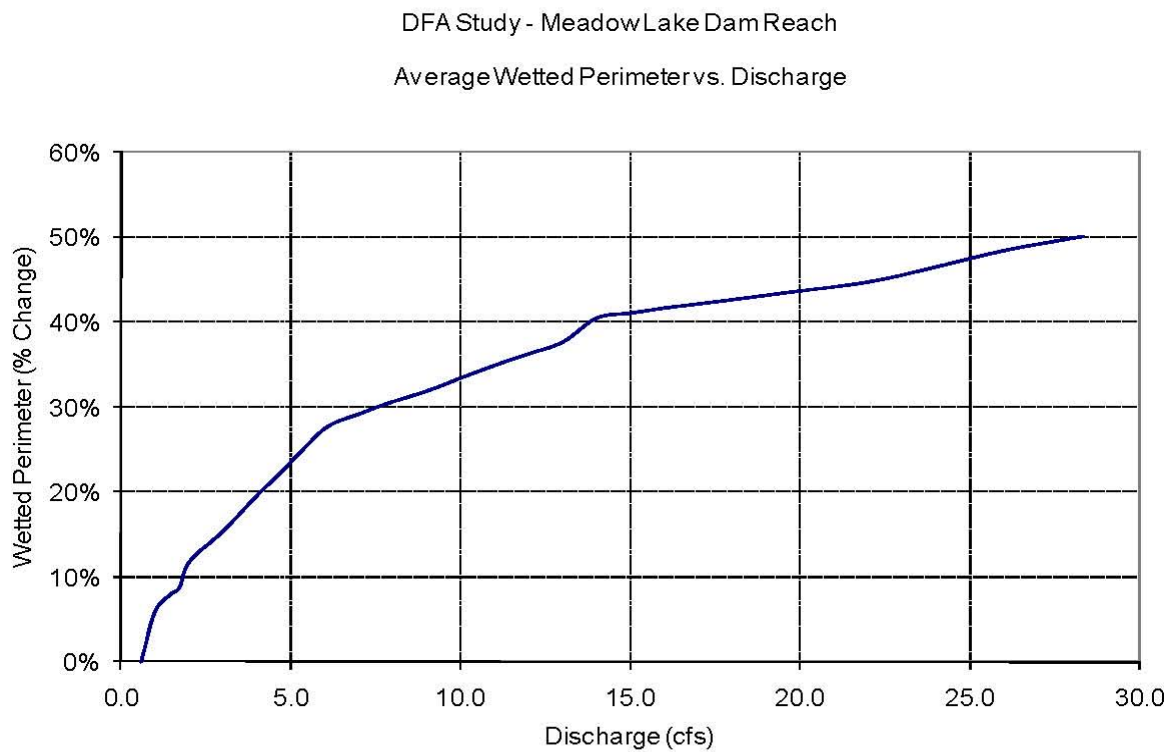


Figure 3-25. Percent change in wetted perimeter as a function of discharge in unnamed tributary below Meadow Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

CFR Study - White Rock Lake Dam Reach #1 & #2

Average Wetted Perimeter vs. Discharge

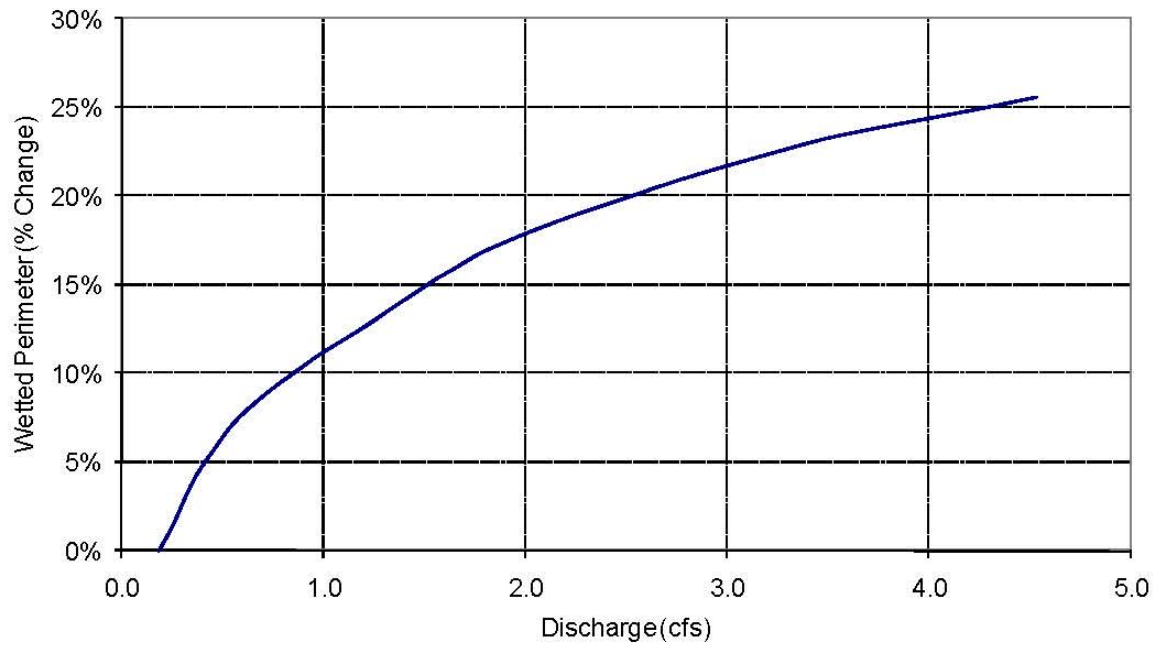


Figure 3-26. Percent change in wetted perimeter as a function of discharge in White Rock Creek below White Rock Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

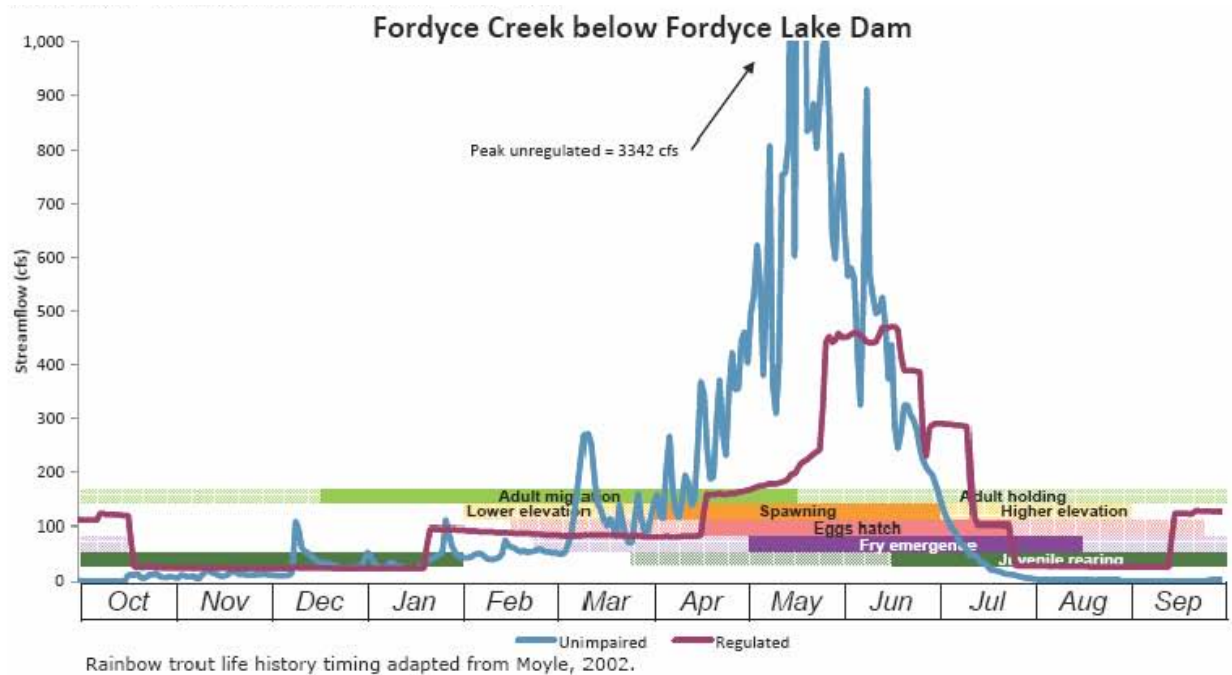


Figure 3-27. Rainbow trout lifestage periodicity and the regulated and estimated unregulated (unimpaired) hydrographs for Fordyce Creek below Fordyce Lake dam. (Source: California Fish and Wildlife *Motion to Intervene and 10(j) and 10(a) Recommendations*, July 30, 2012)

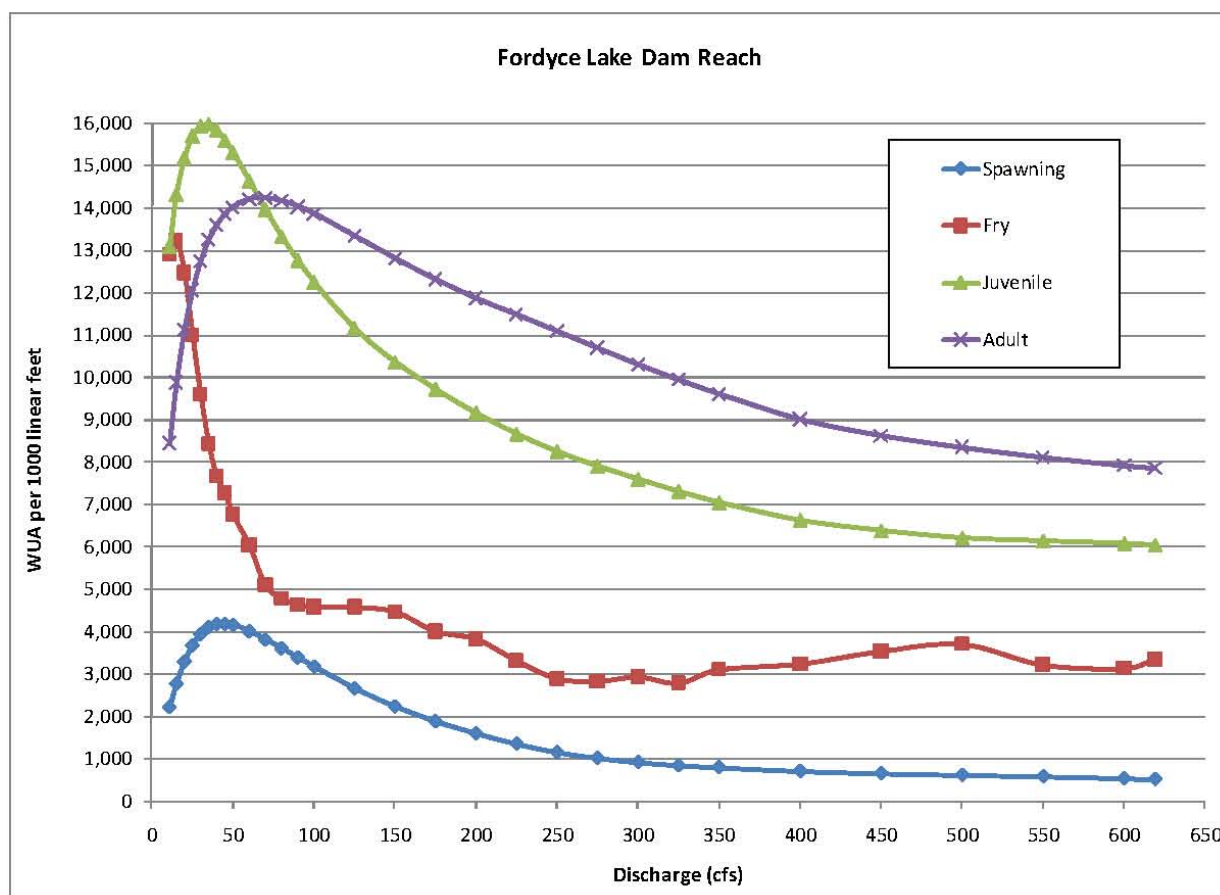


Figure 3-28. WUA for rainbow trout, Fordyce Creek below Fordyce Lake dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

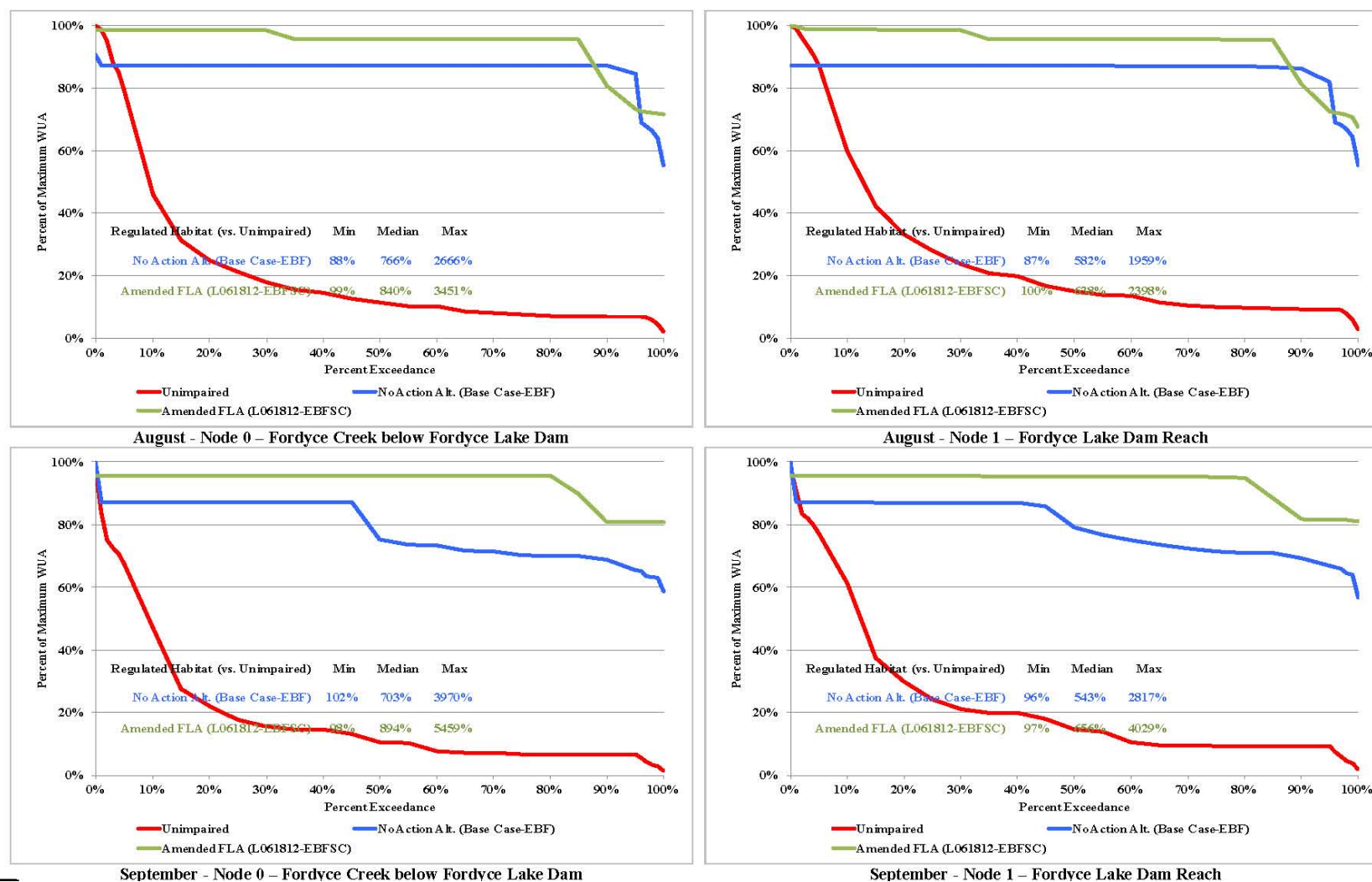


Figure 3-29. HEA for adult rainbow trout during August and September in Fordyce Creek below Fordyce Lake dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

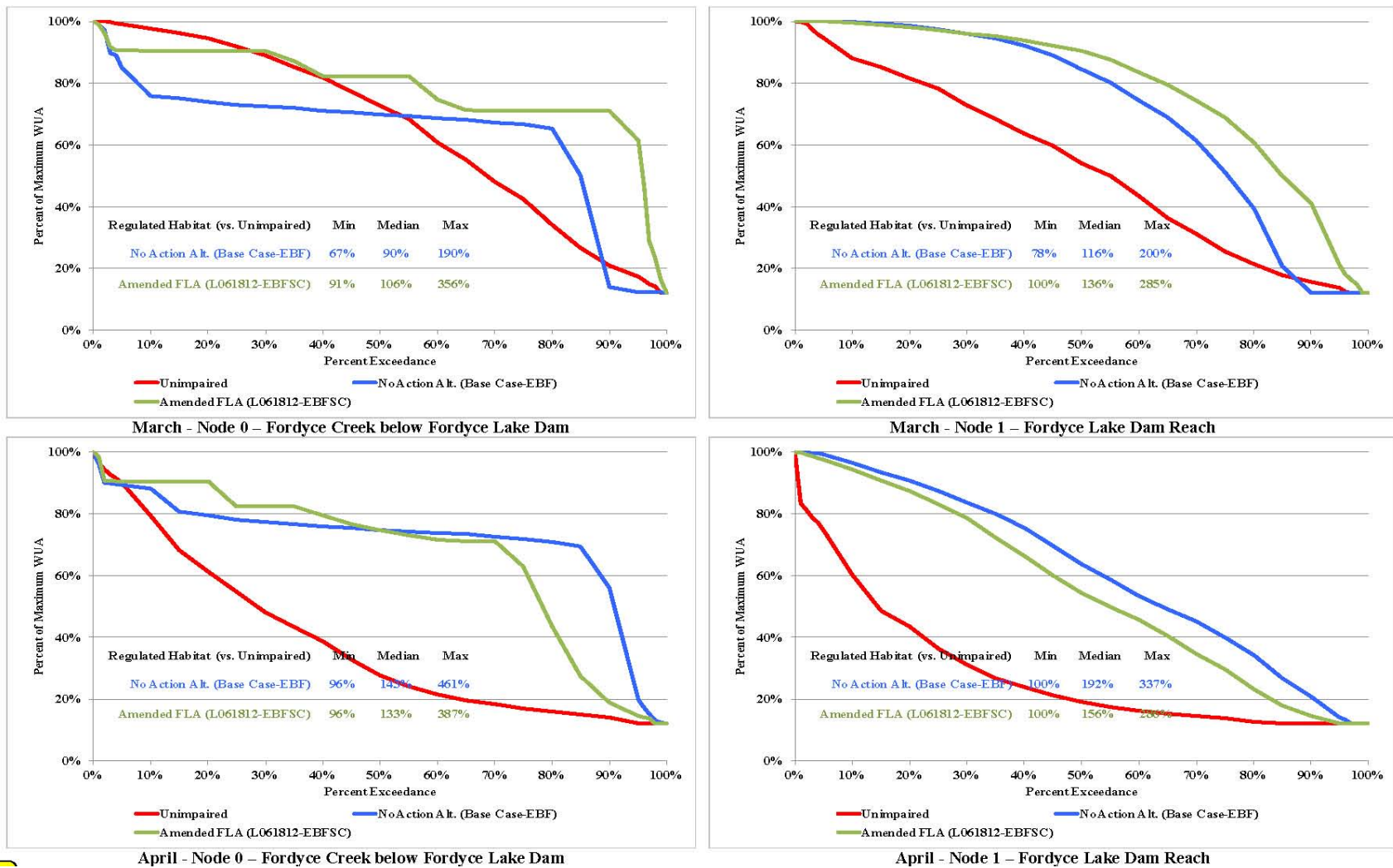


Figure 3-30. HEA for rainbow trout spawning during March and April in Fordyce Creek below Fordyce Lake dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

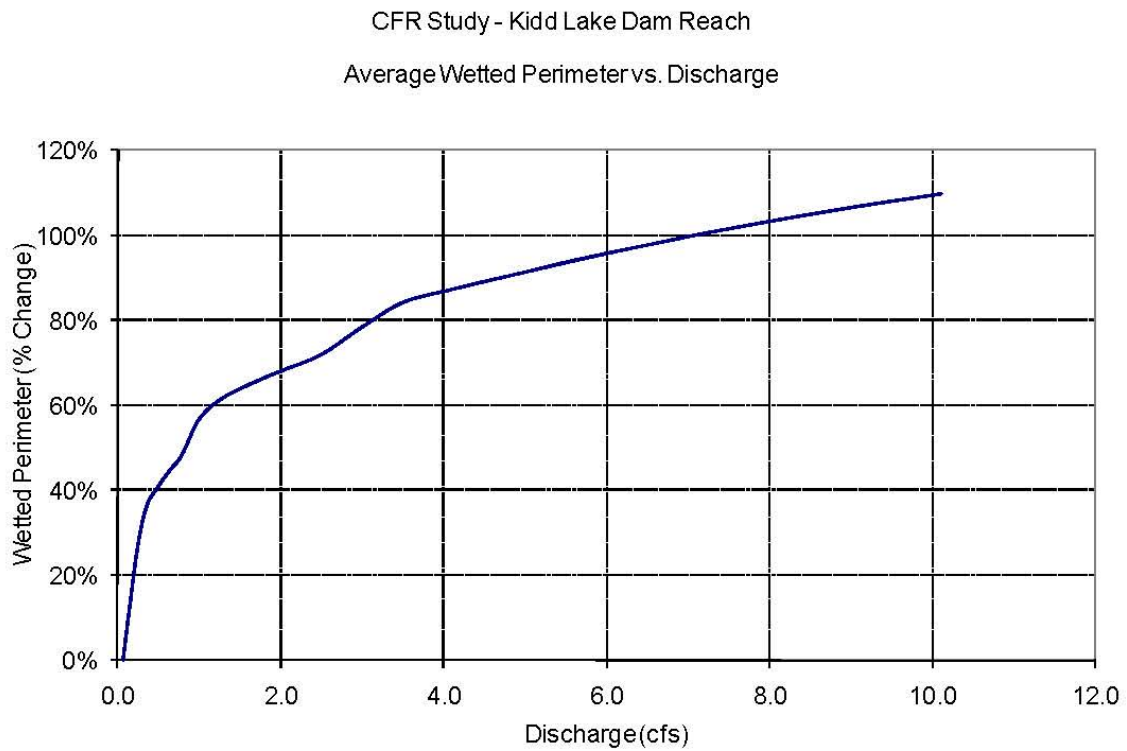


Figure 3-31. Percent change in wetted perimeter as a function of discharge in unnamed tributary below Kidd Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

CFR Study - Upper South Yuba Reach #1

Average Wetted Perimeter vs. Discharge

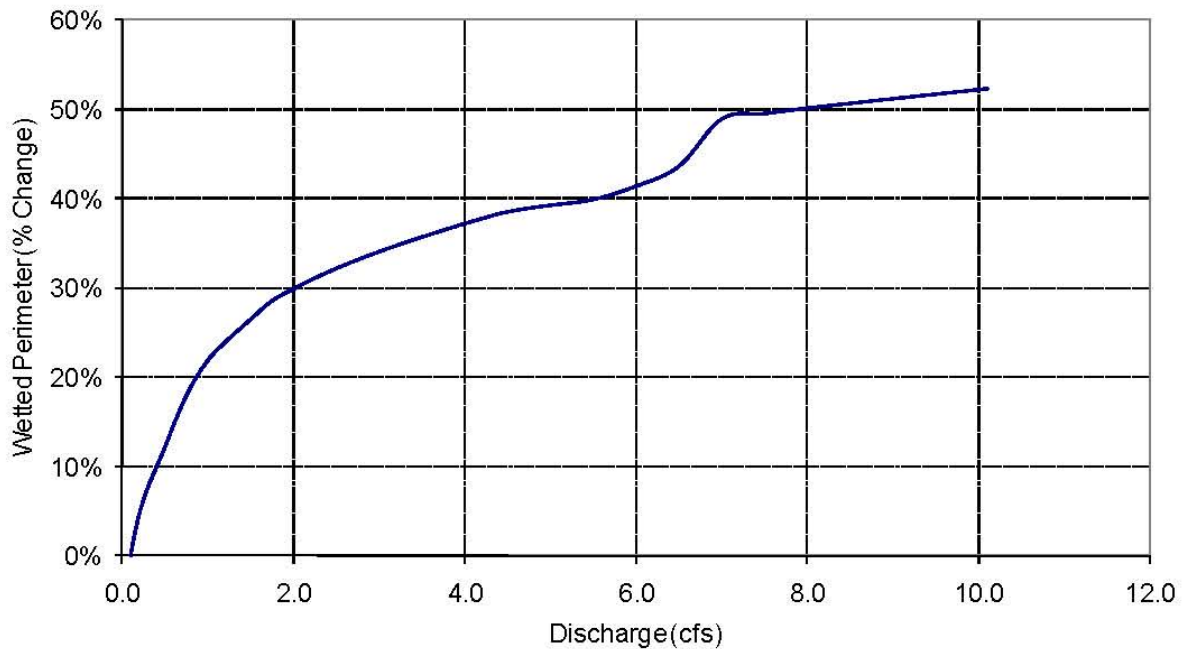


Figure 3-32. Percent change in wetted perimeter as a function of discharge in South Yuba River below the confluence of unnamed tributary below Kidd Lake and Cascade Creek, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

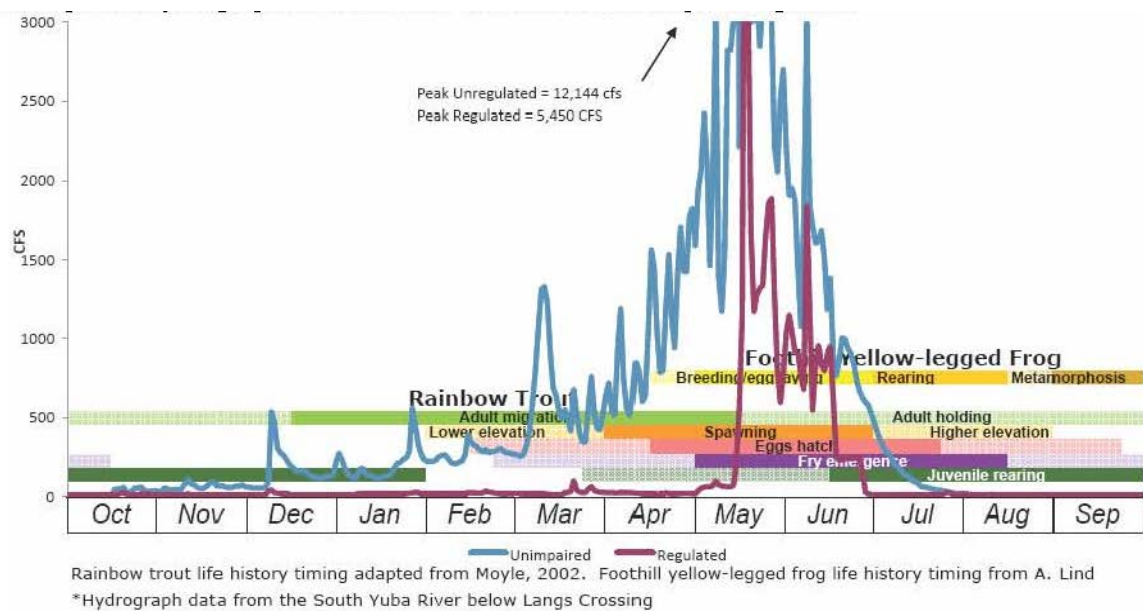


Figure 3-33. Rainbow trout and yellow-legged frog lifestage periodicity and the regulated and estimated unregulated (unimpaired) hydrographs for the South Yuba River below Spaulding dam. (Source: California Fish and Wildlife *Motion to Intervene and 10(j) and 10(a) Recommendations*, July 30, 2012)

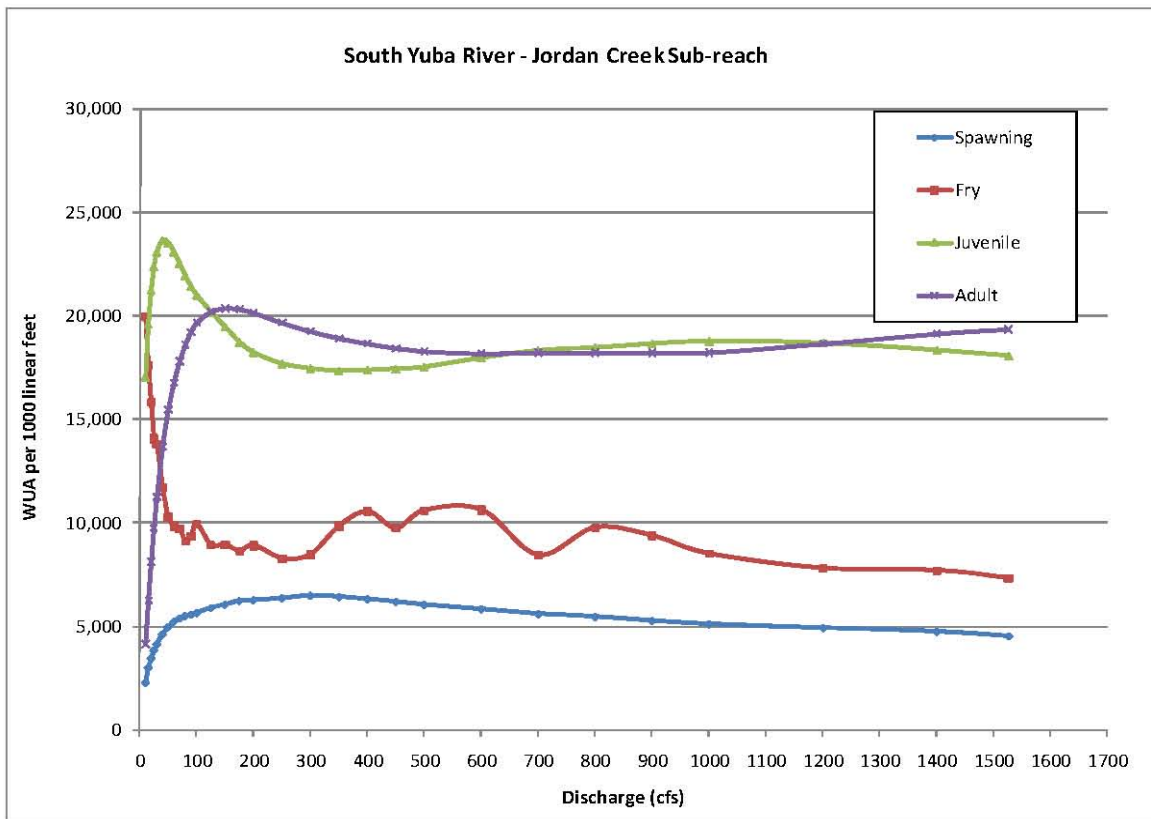


Figure 3-34. WUA for rainbow trout, South Yuba River below Jordan Creek. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

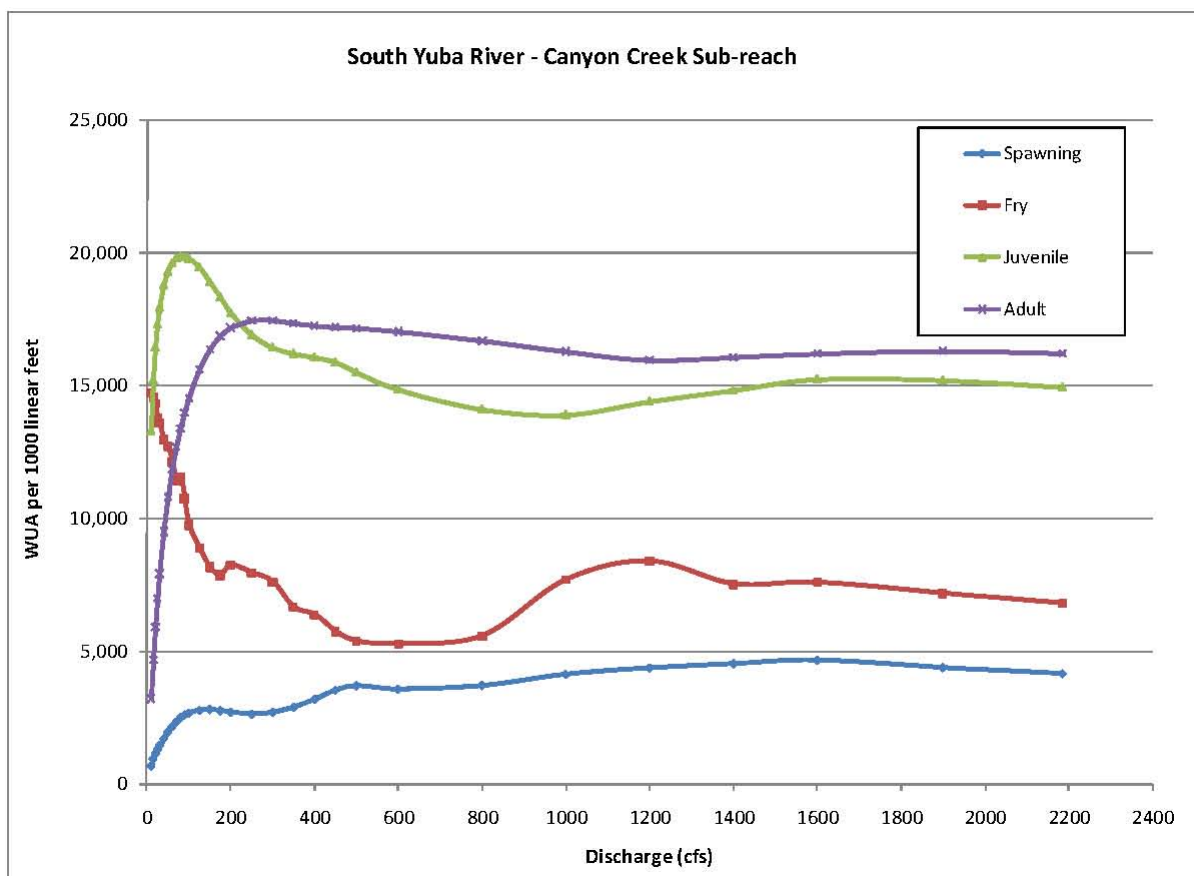


Figure 3-35. WUA for rainbow trout, South Yuba River below Canyon Creek. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

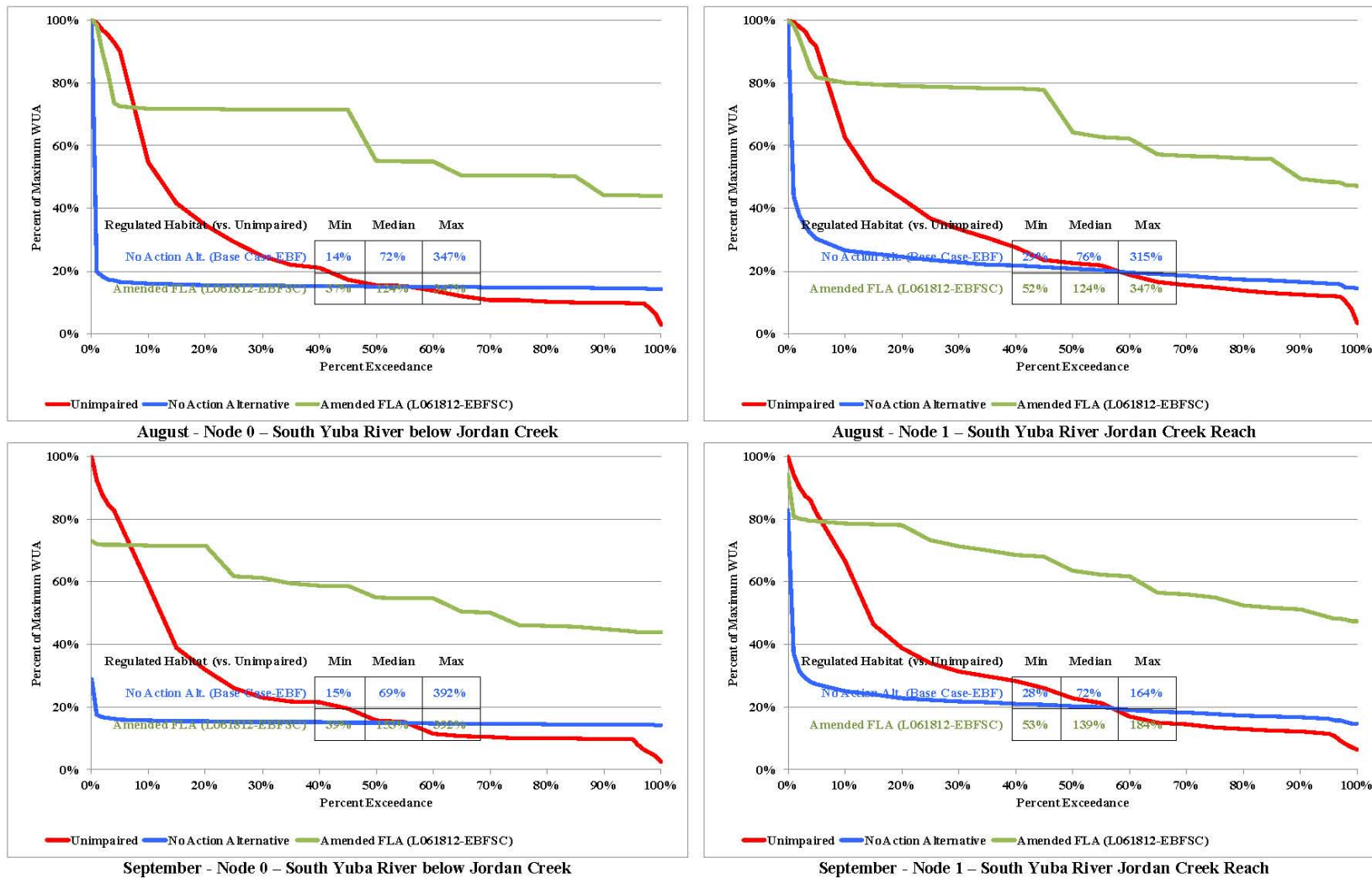
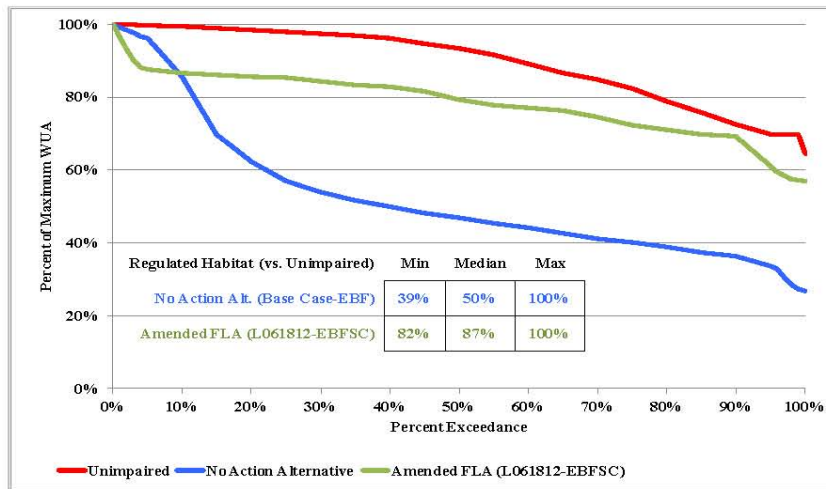
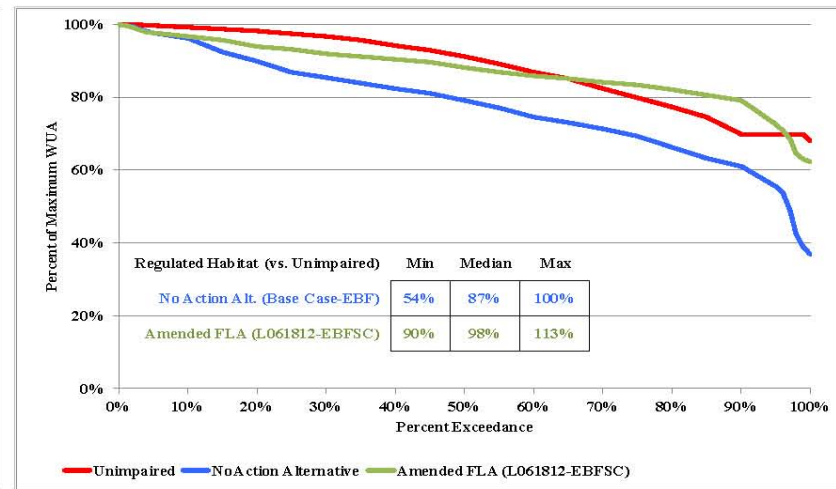


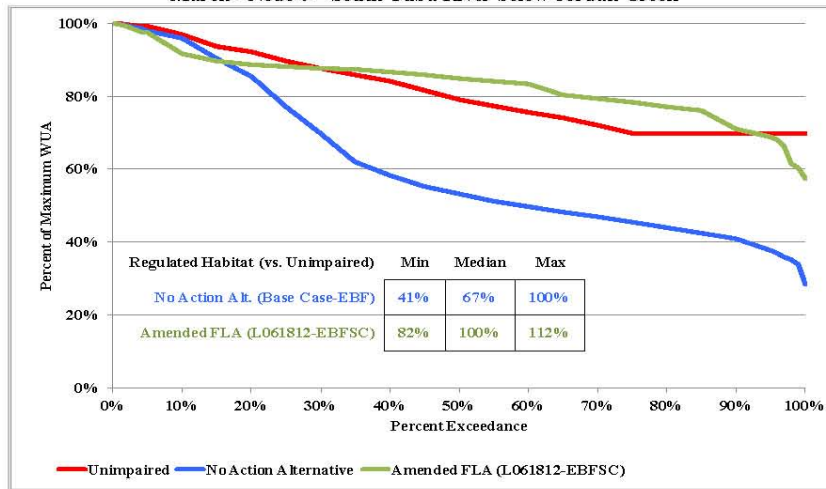
Figure 3-36. HEA for adult rainbow trout during the months of August (k) and September (l) in South Yuba River below Lake Spaulding dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])



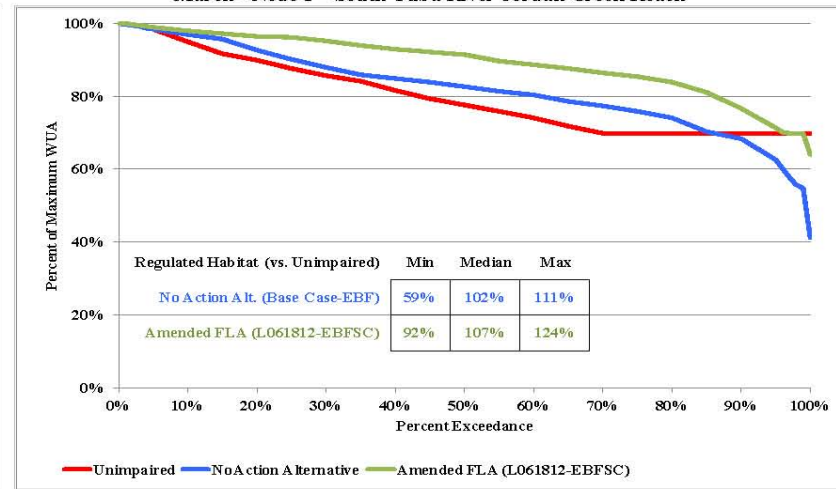
March - Node 0 - South Yuba River below Jordan Creek



March - Node 1 - South Yuba River Jordan Creek Reach



April - Node 0 - South Yuba River below Jordan Creek



April - Node 1 - South Yuba River Jordan Creek Reach

Figures 3-37. HEA for spawning rainbow trout during the months of March (a) and April (b) in South Yuba River below Lake Spaulding dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

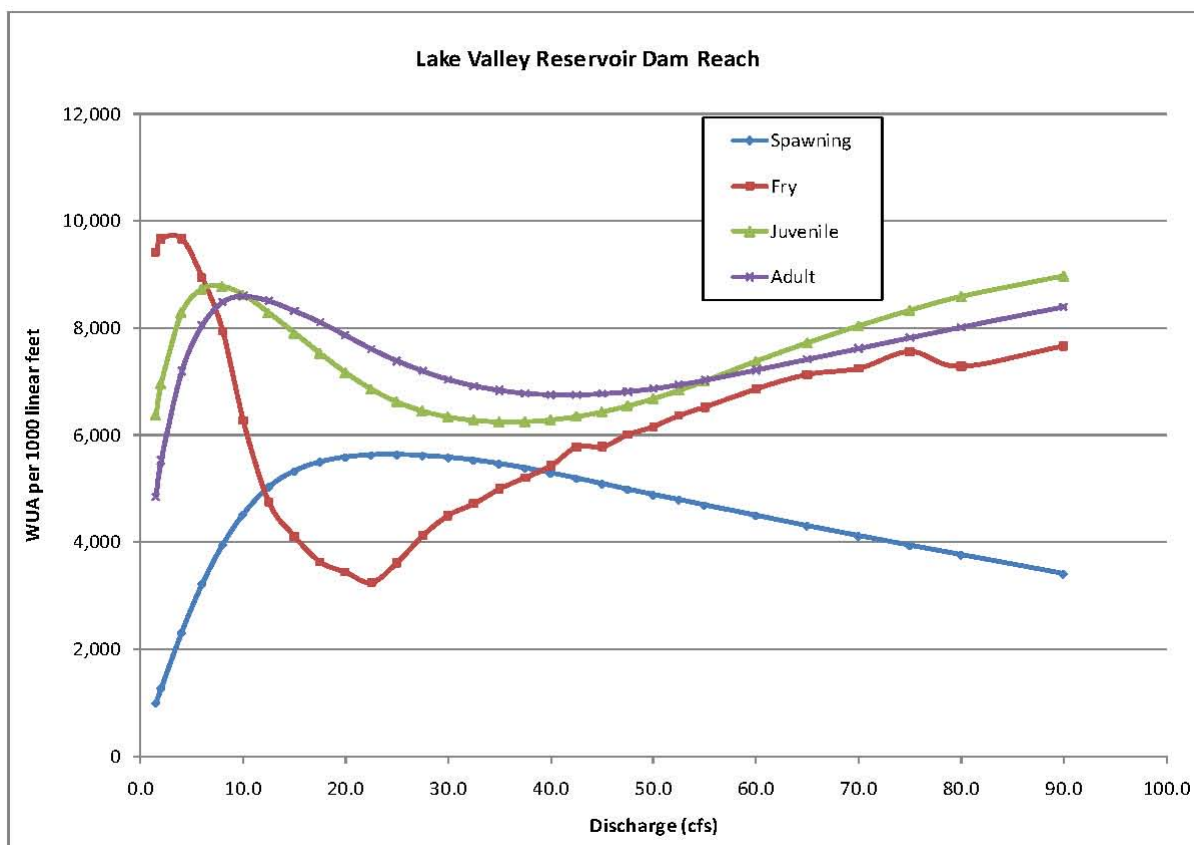
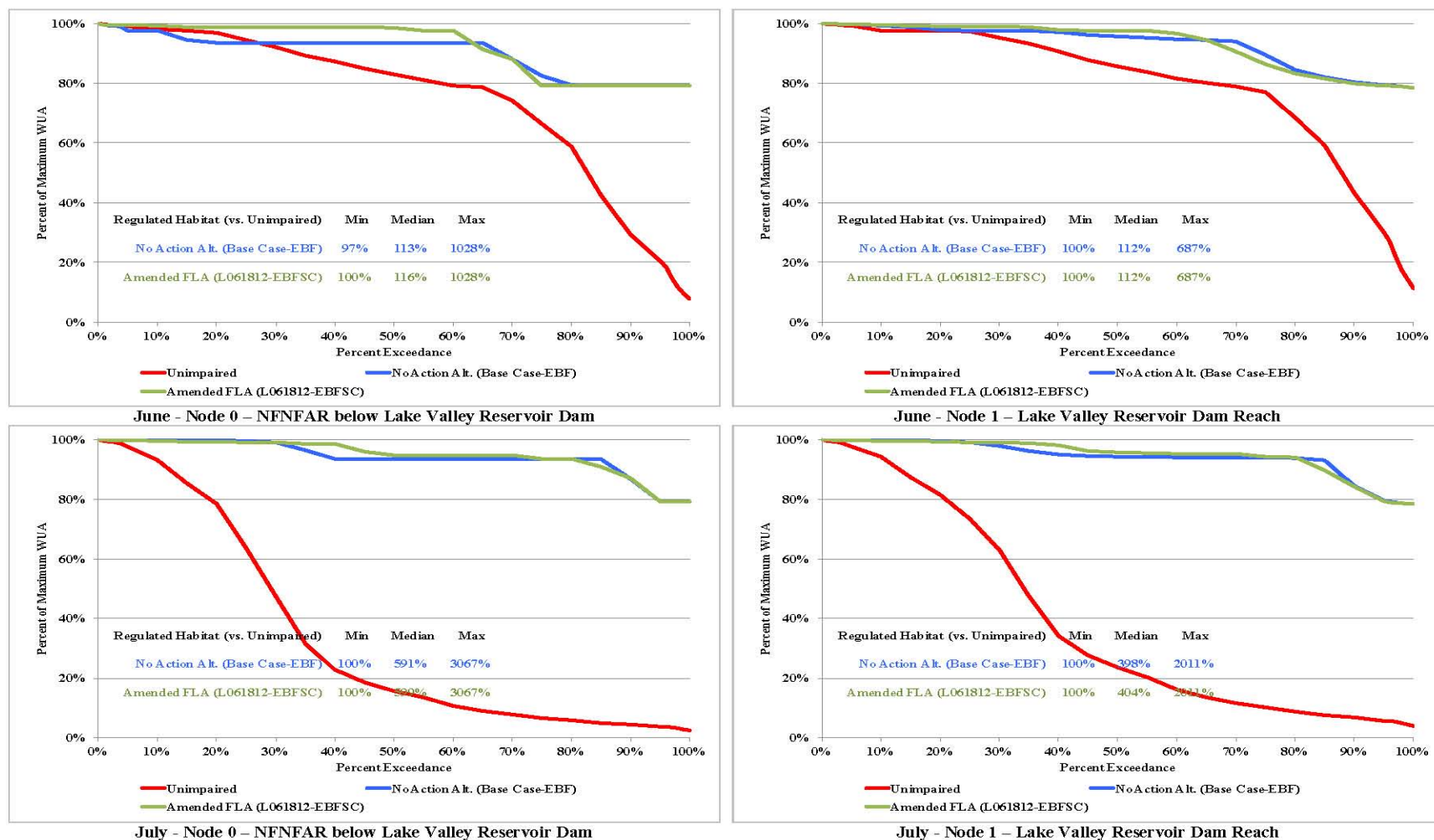
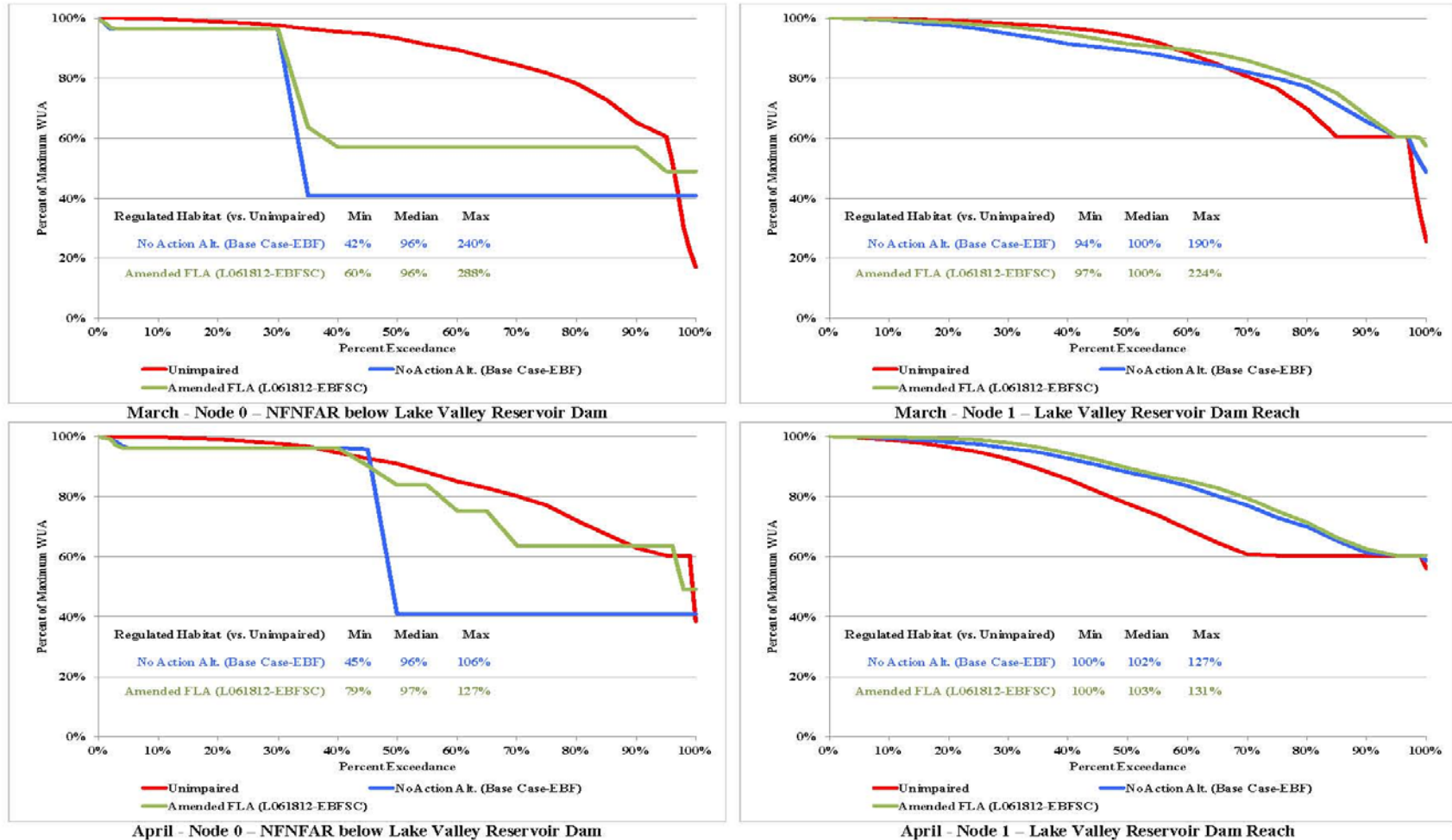


Figure 3-38. WUA for rainbow trout, North Fork of the North Fork American River below Lake Valley reservoir dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)



Figures 3-39. HEA for adult rainbow trout during the month of June (i) and adult rainbow trout during the month of July (j) in North Fork of the North Fork American River below Lake Valley reservoir dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])



Figures 3-40. HEA for spawning rainbow trout during the months of March (a) and April (b) in the North Fork of the North Fork American River below Lake Valley reservoir dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

CFR Study - Kelly Lake Dam Reach
Average Wetted Perimeter vs. Discharge

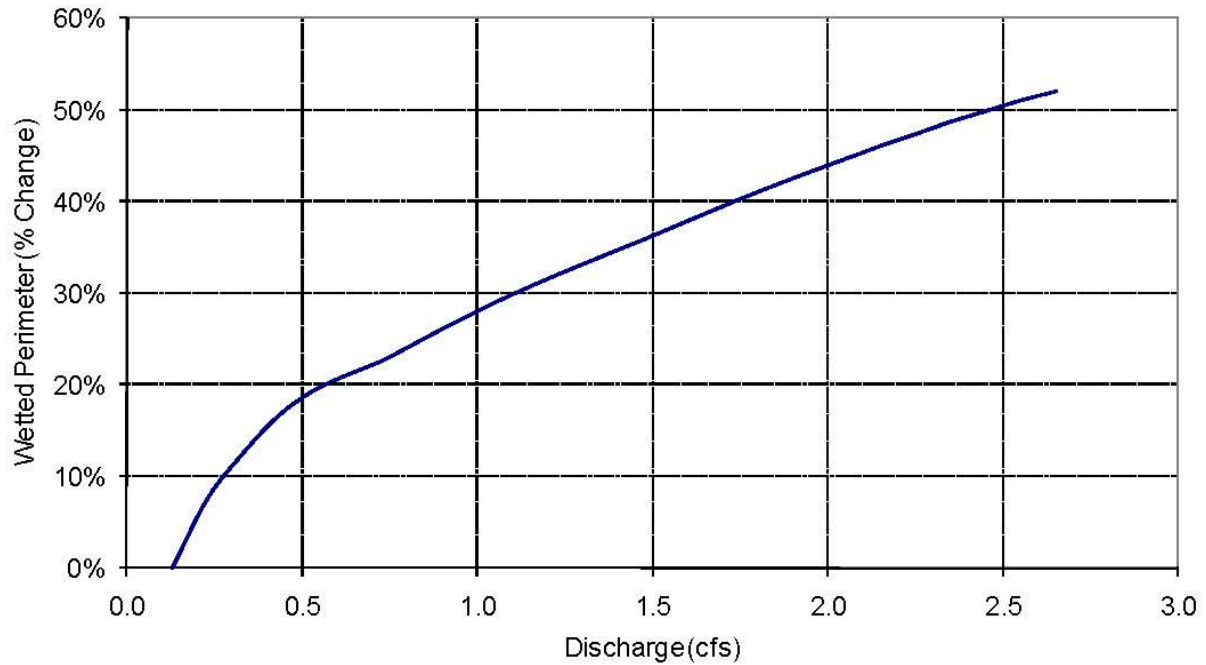


Figure 3-41. Percent change in wetted perimeter as a function of discharge in Sixmile Creek below Kelly Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

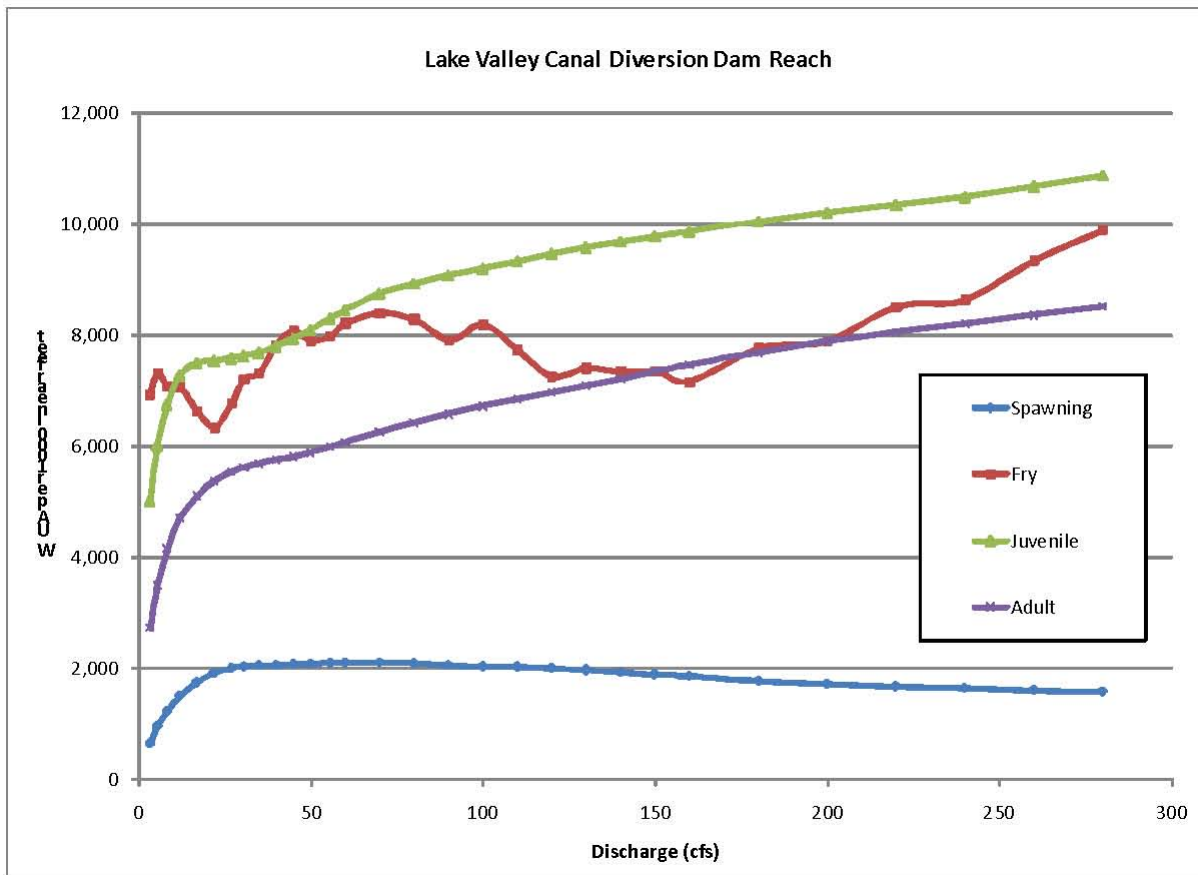


Figure 3-42. WUA for rainbow trout, North Fork of the North Fork American River below Lake Valley canal diversion dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

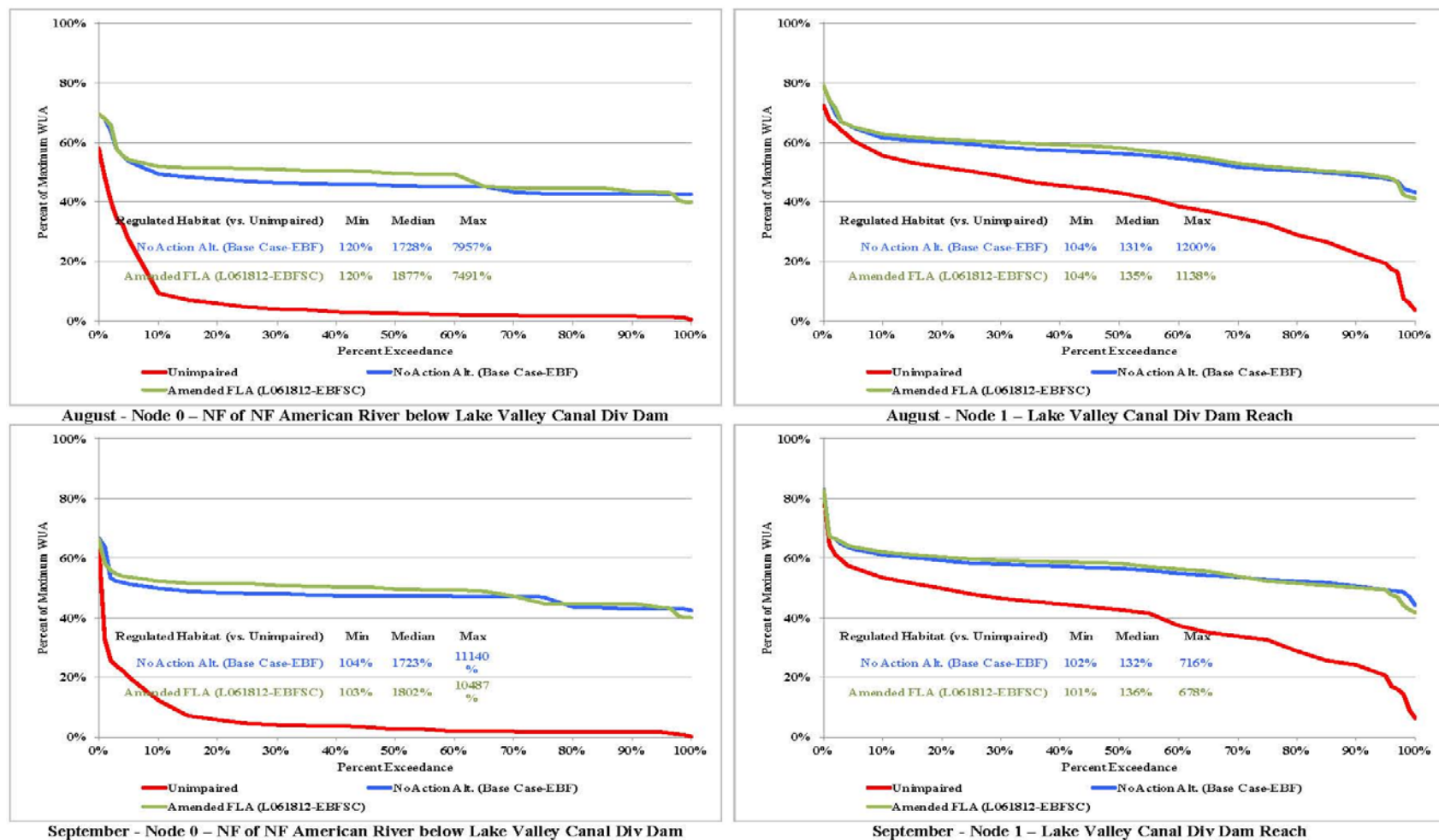


Figure 3-43. HEA for adult rainbow trout during the months of August (k) and September (l) in North Fork of the North Fork American River below Lake Valley canal diversion dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

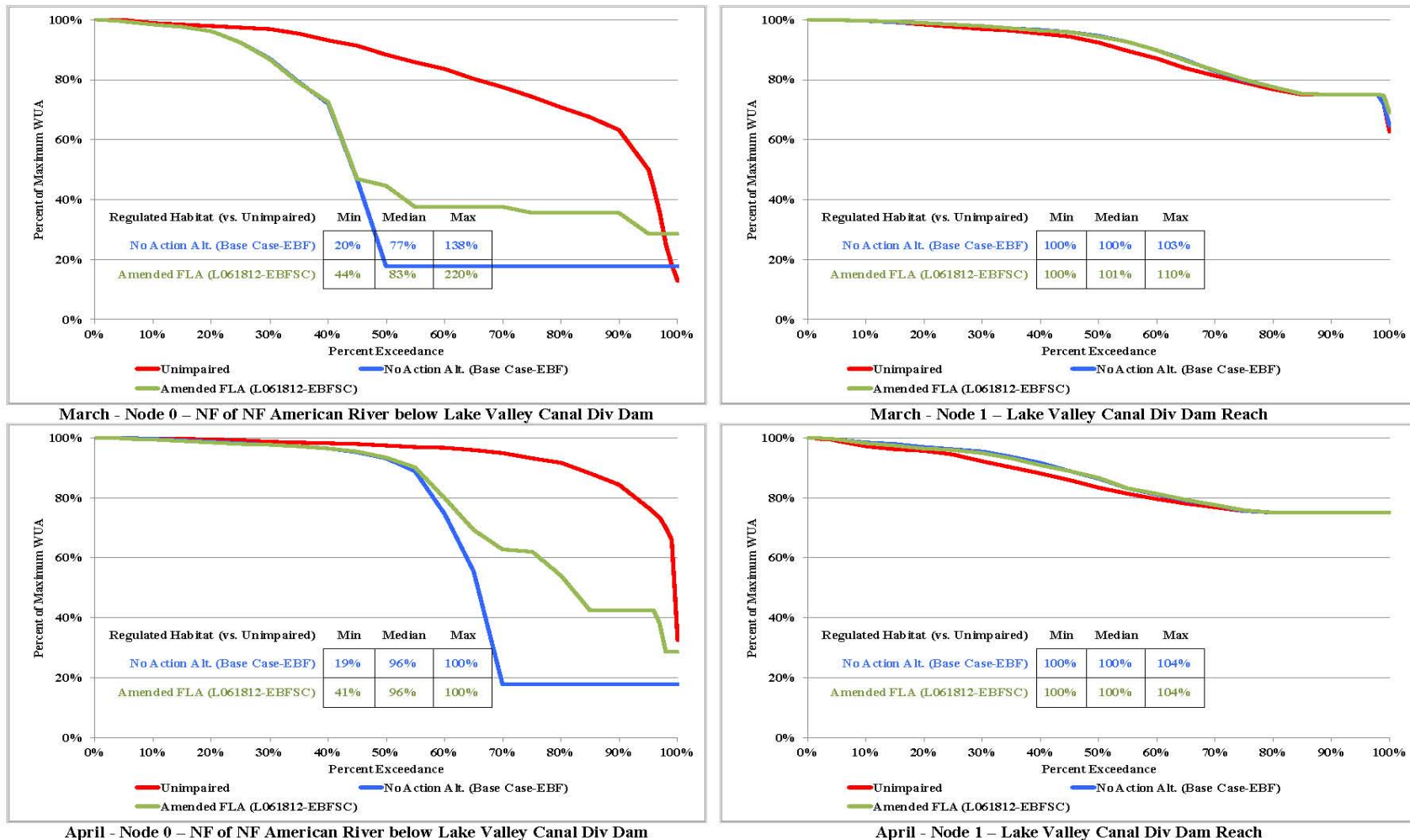


Figure 3-44. HEA for spawning rainbow trout during the months of March (a) and April (b) in the North Fork of the North Fork American River below Lake Valley canal diversion dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

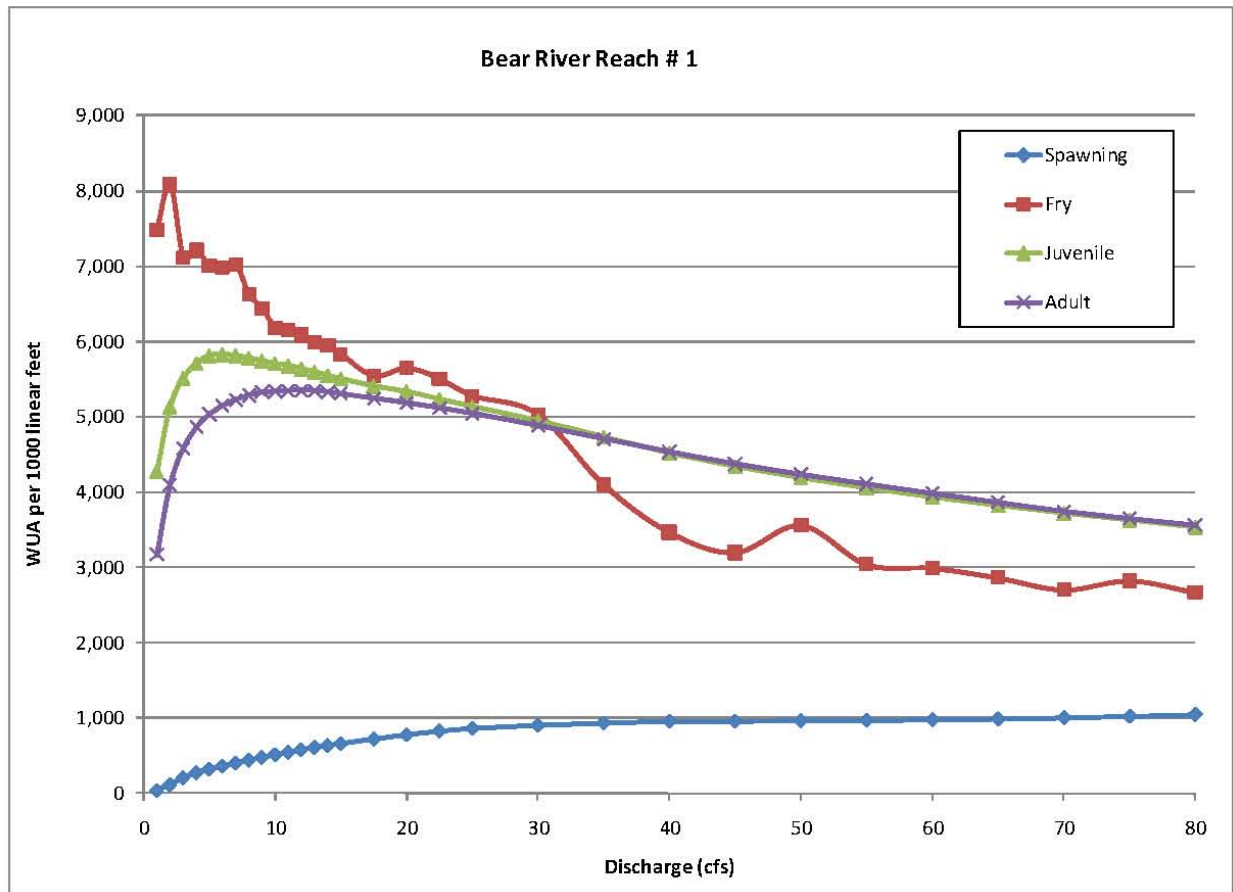


Figure 3-45. WUA for rainbow trout, Bear River below Drum canal spillway gate. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

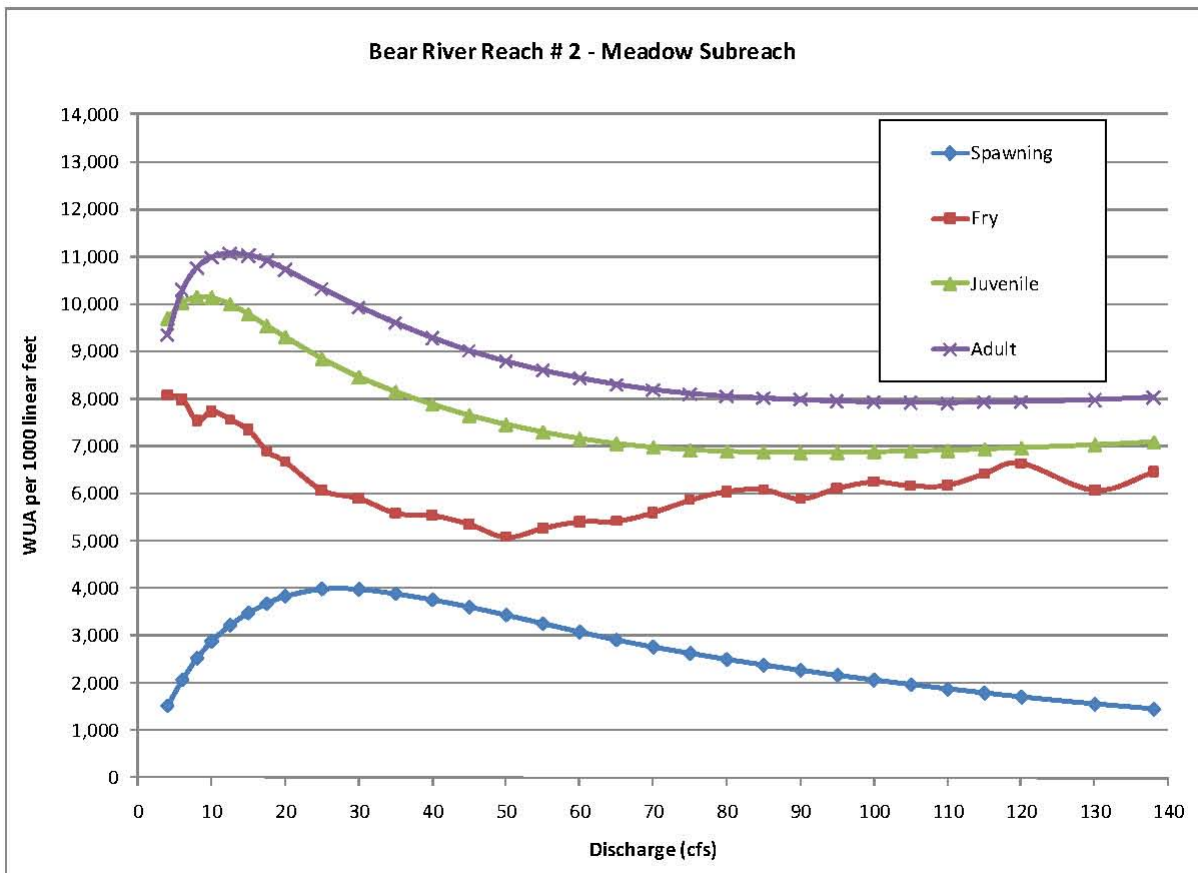


Figure 3-46. WUA for rainbow trout, Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198 Meadow sub-reach. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

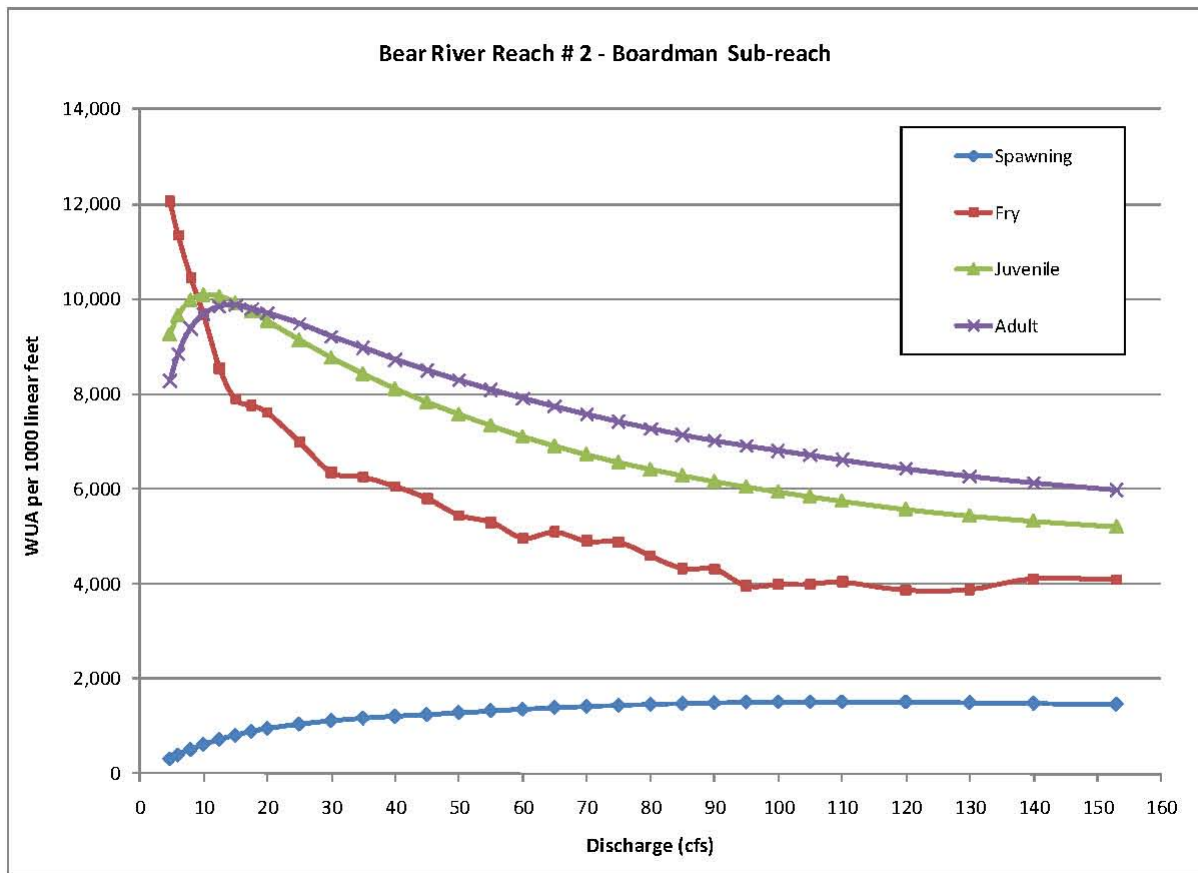


Figure 3-47. WUA for rainbow trout, Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198 Boardman sub-reach. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

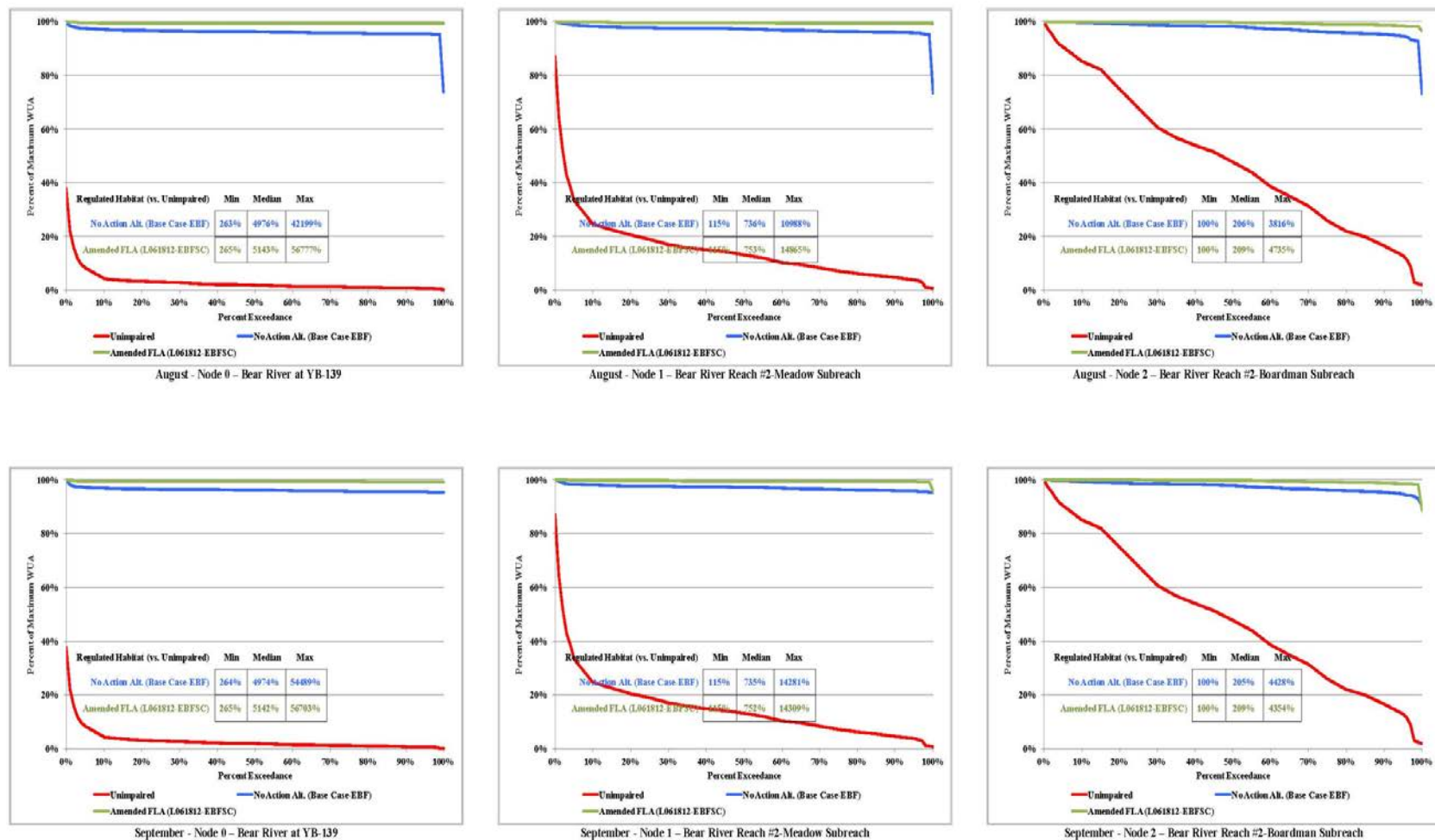
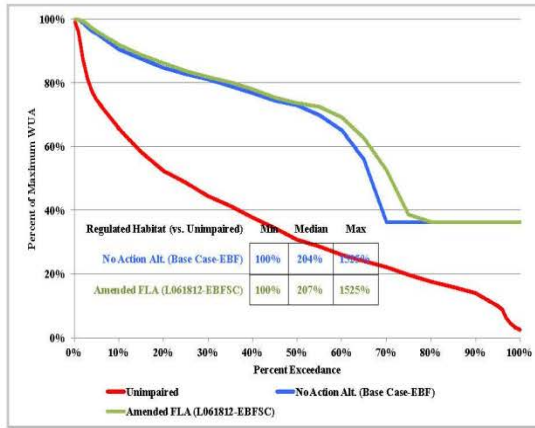
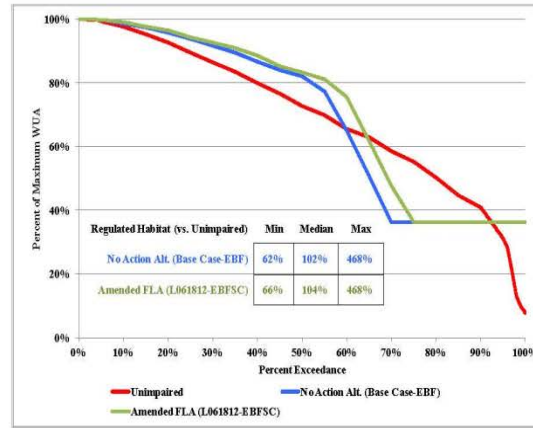


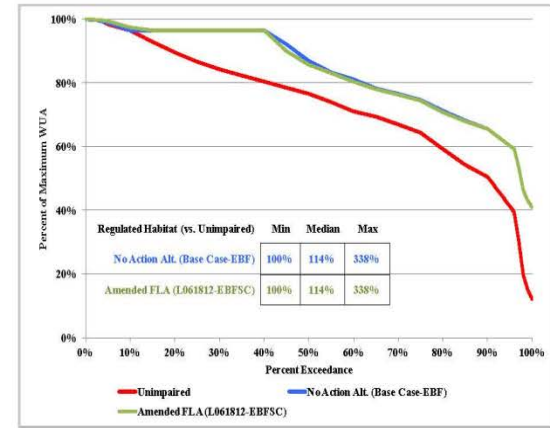
Figure 3-48. HEA for adult rainbow trout during the months of August (k) and September (l) in Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198 under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])



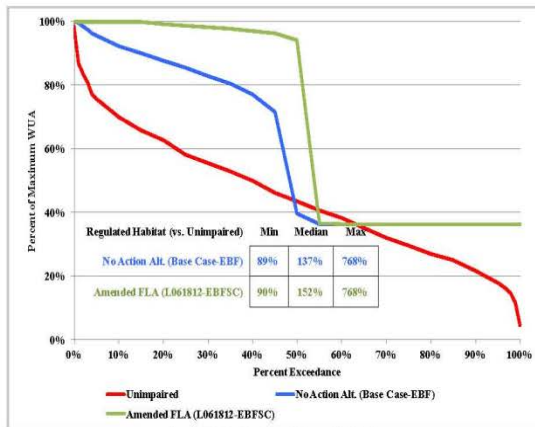
March - Node 0 - Bear River at YB-139



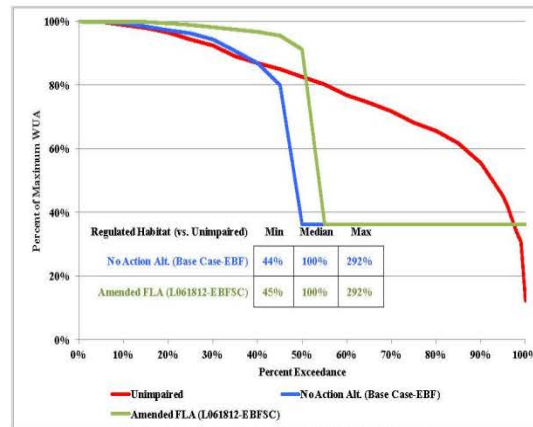
March - Node 1 - Bear River Reach #2-Meadow Subreach



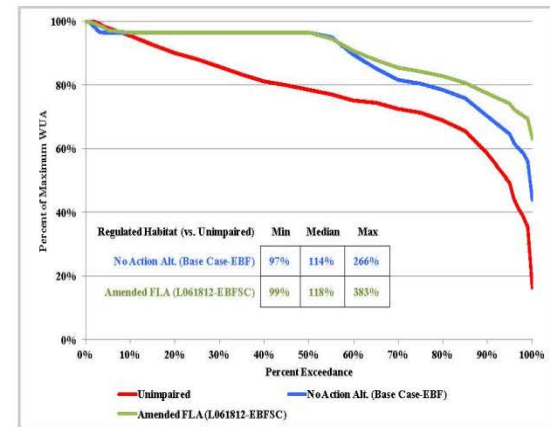
March - Node 2 - Bear River Reach #2-Boardman Subreach



April - Node 0 - Bear River at YB-139



April - Node 1 - Bear River Reach #2-Meadow Subreach



April - Node 2 - Bear River Reach #2-Boardman Subreach

Figures 3-49. HEA for spawning rainbow trout during the months of March (a) and April (b) in Bear River at Highway 20 crossing, between South Yuba canal inflow at gage YB-139 and gage YB-198 under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

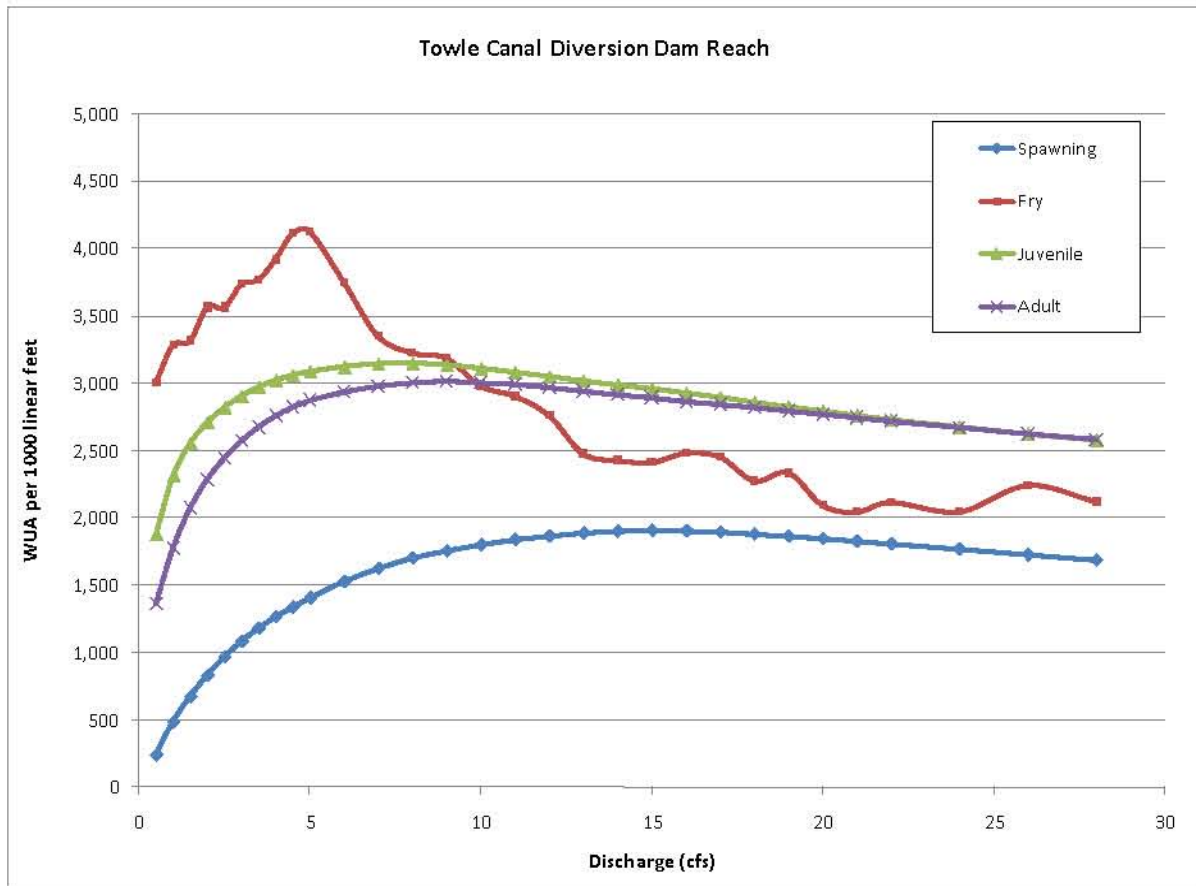
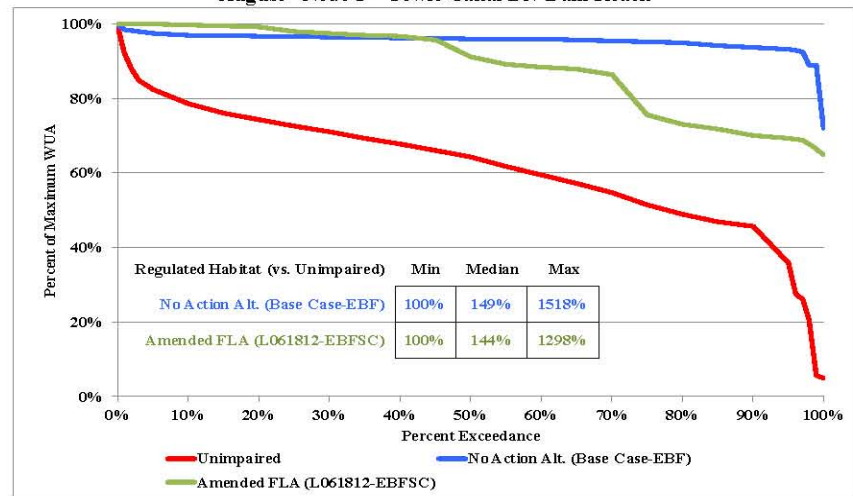
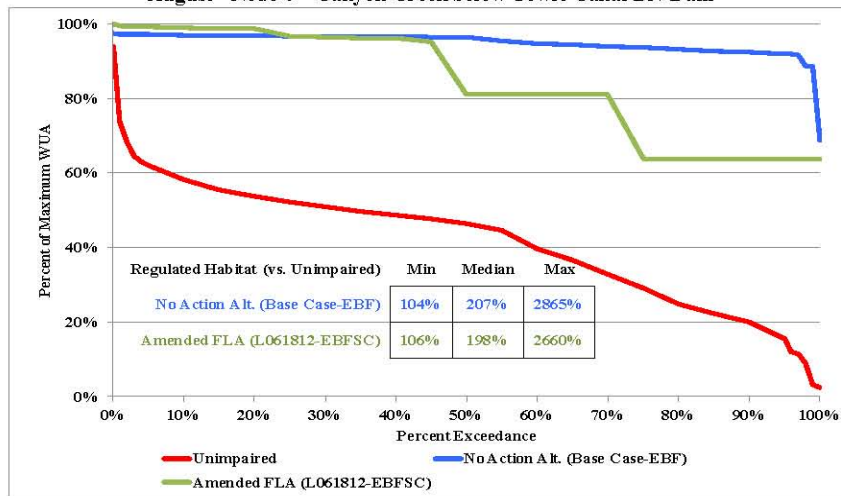
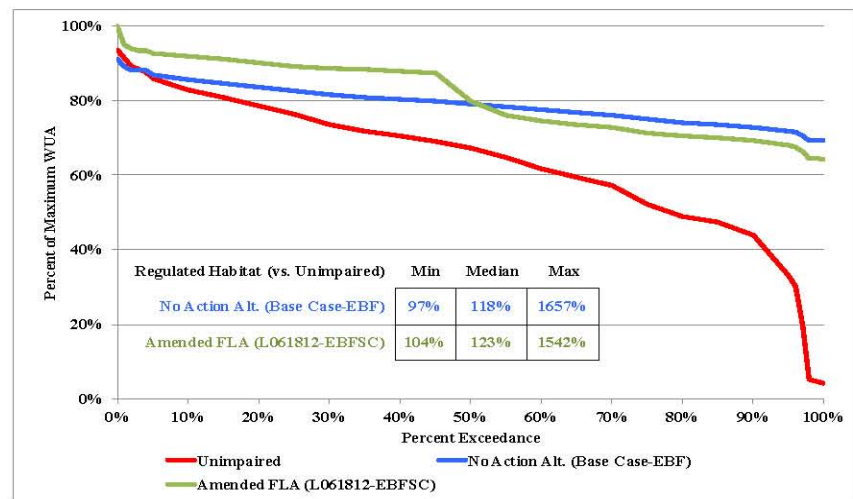
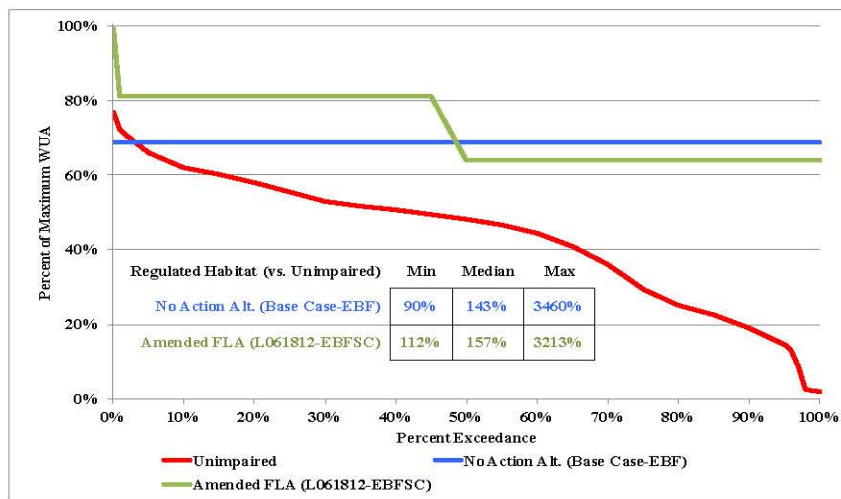


Figure 3-50. Modeled habitat suitability index (WUA) for rainbow trout, Canyon Creek below Towle canal diversion dam (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)



Figures 3-51. HEA for adult rainbow trout during the months of August (k) and September (l) in Canyon Creek below Towle canal diversion dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

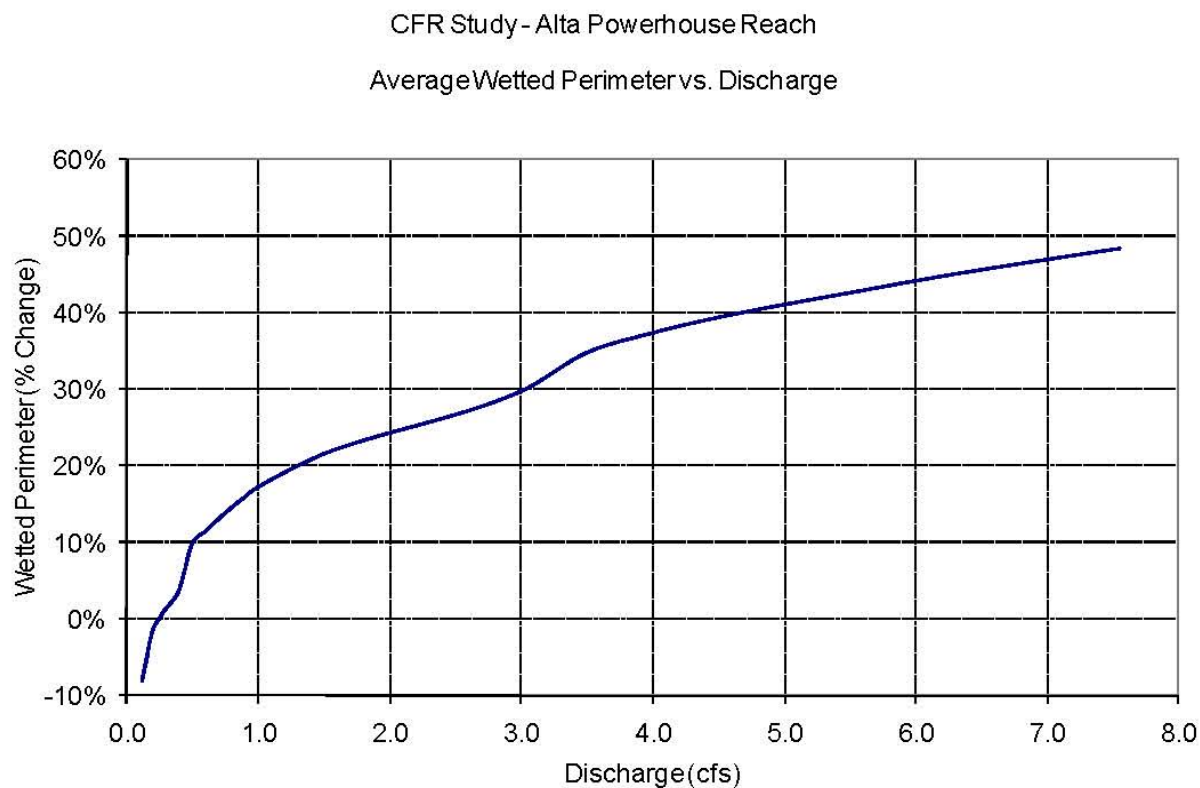


Figure 3-52. Percent change in wetted perimeter as a function of discharge in Little Bear River below Alta powerhouse tailrace, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

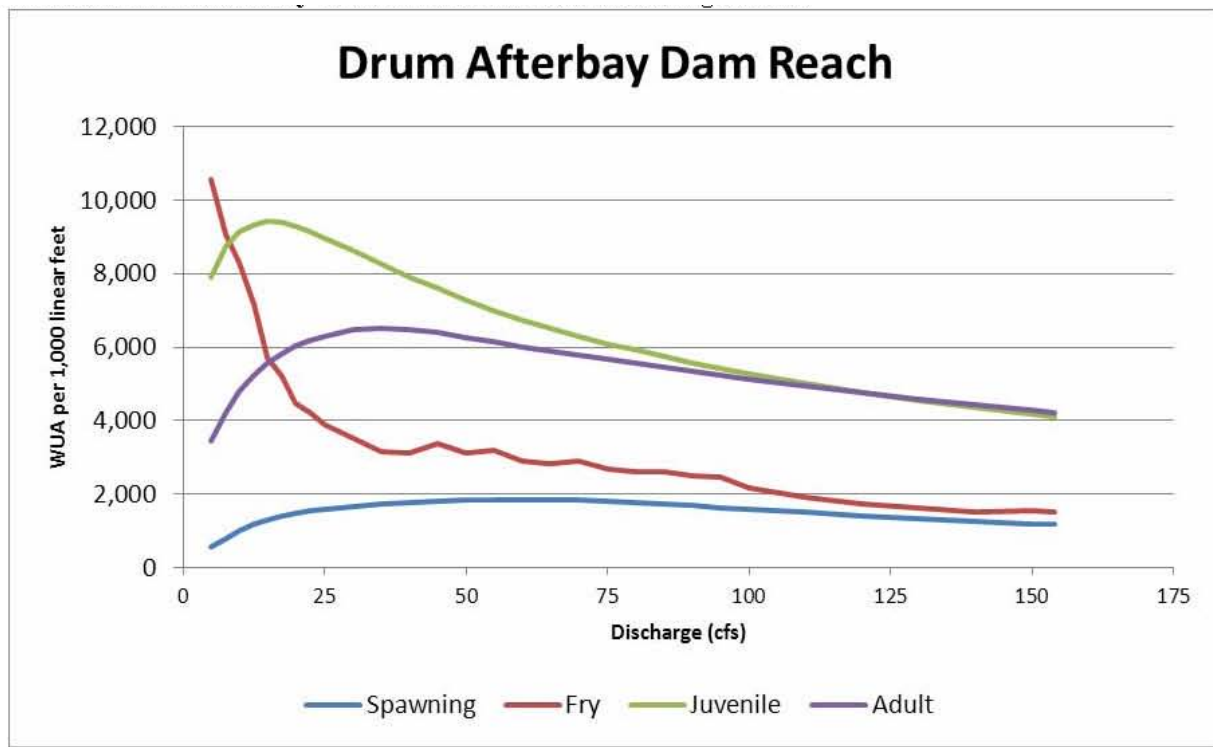


Figure 3-53. Bear River below Drum afterbay dam PHABSIM modeling results. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

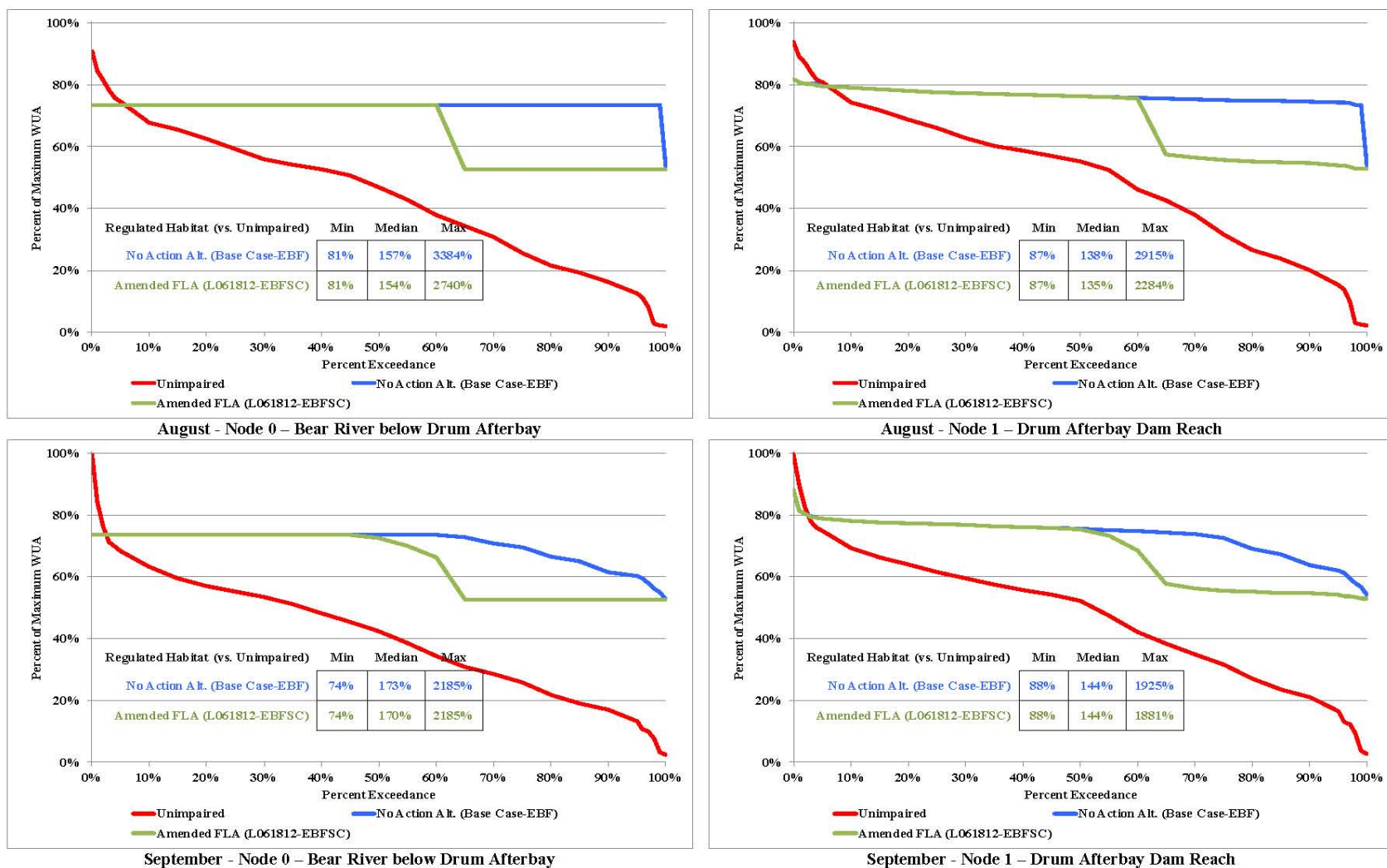


Figure 3-54. HEA for adult rainbow trout during the months of August (k) and September (l) in Bear River below Drum afterbay dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])

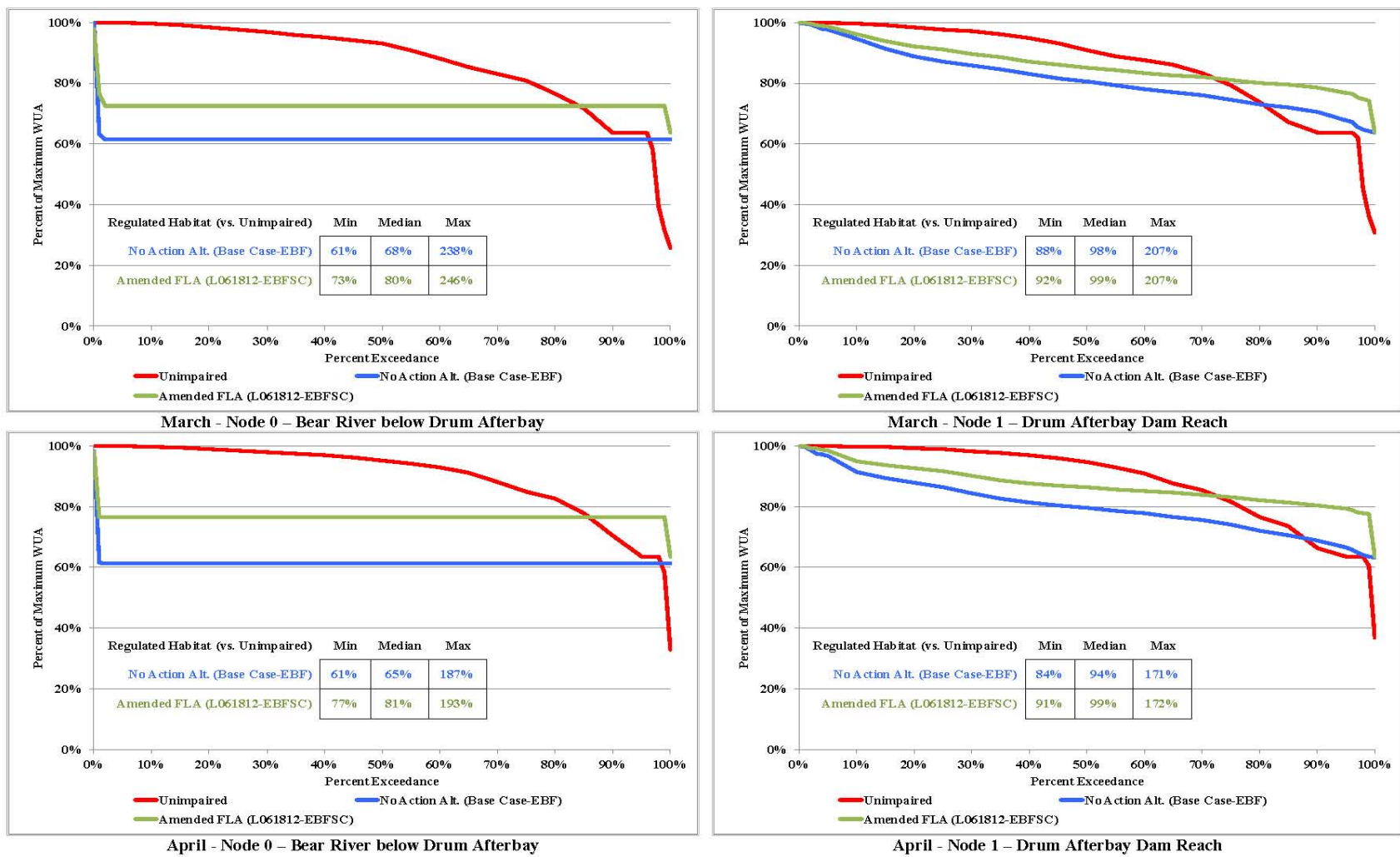


Figure 3-55. HEA for spawning rainbow trout during the months of March (a) and April (b) in Bear River below Drum afterbay dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 4 to PG&E's License Application, as Amended [August 30, 2012])



Figure 3-56. Percent change in wetted perimeter as a function of discharge in Dry Creek below Halsey afterbay dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

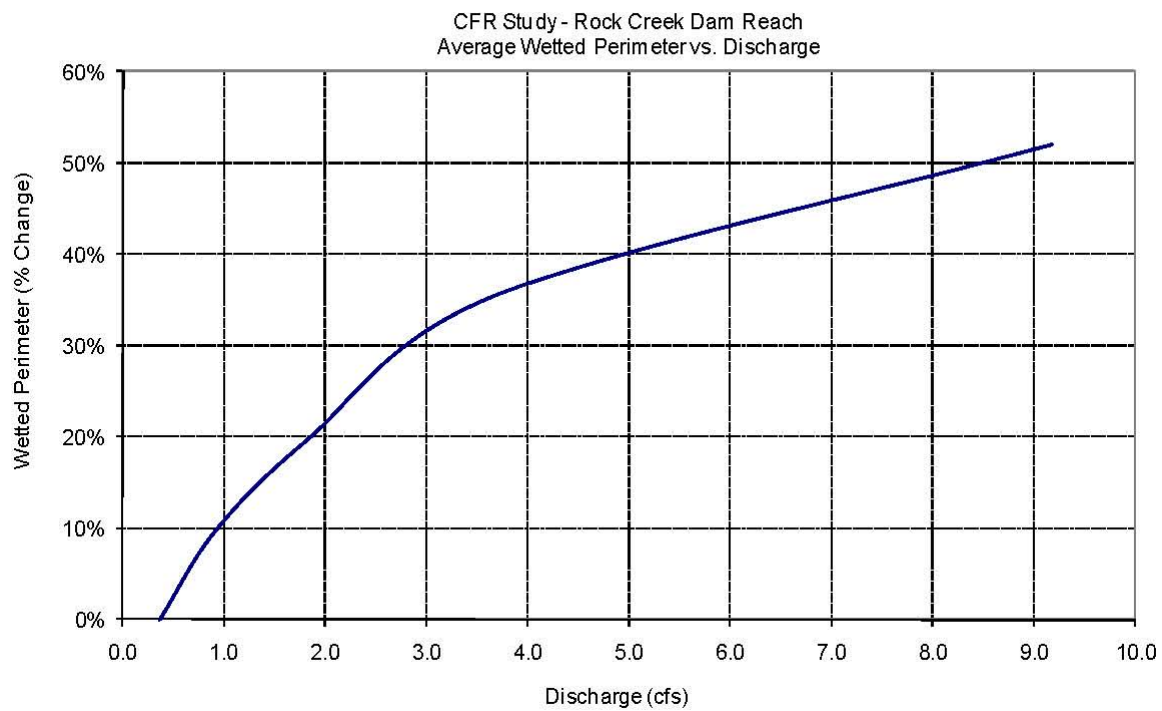


Figure 3-57. Percent change in wetted perimeter as a function of discharge in Rock Creek below Rock Creek reservoir dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

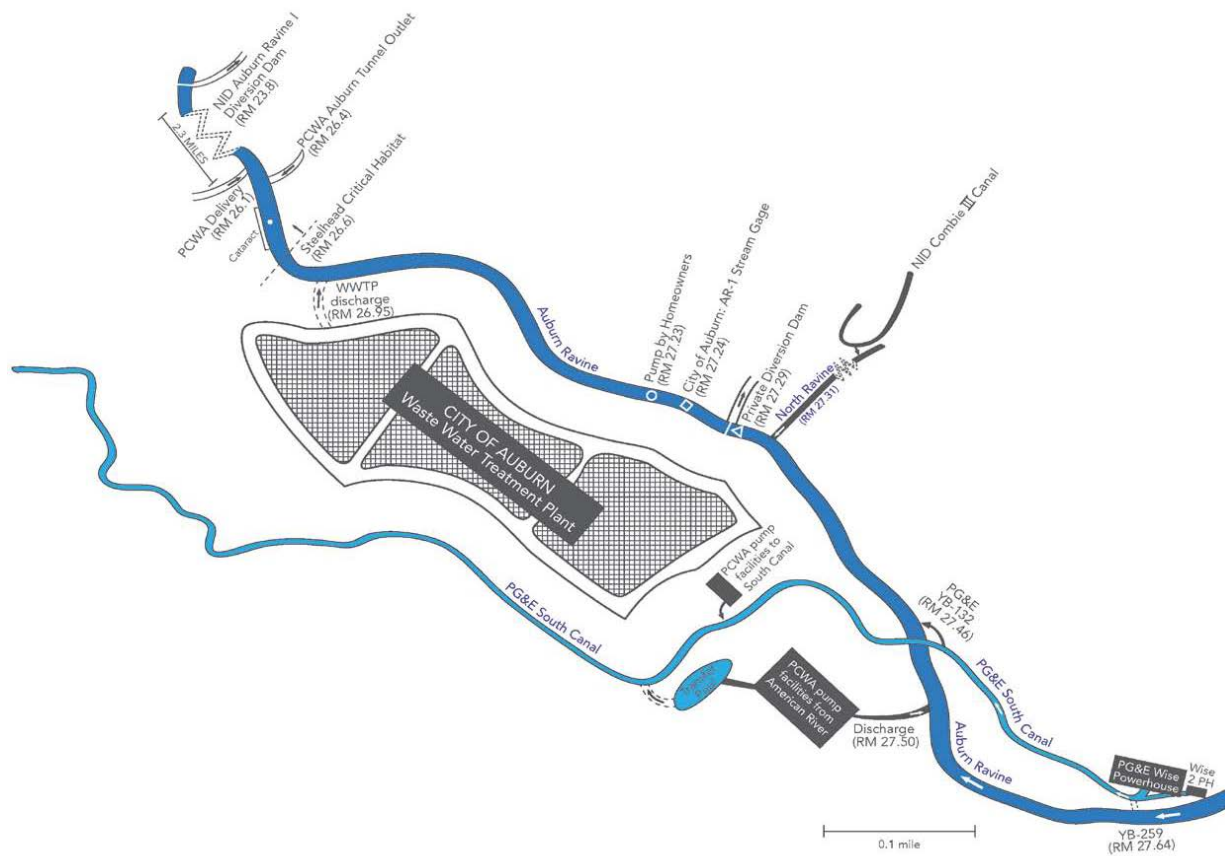


Figure 3-58. Diagram of Upper Auburn Ravine showing relationship of PG&E release point from South canal, other water discharges, and withdrawals, and barriers to anadromous fish migration.

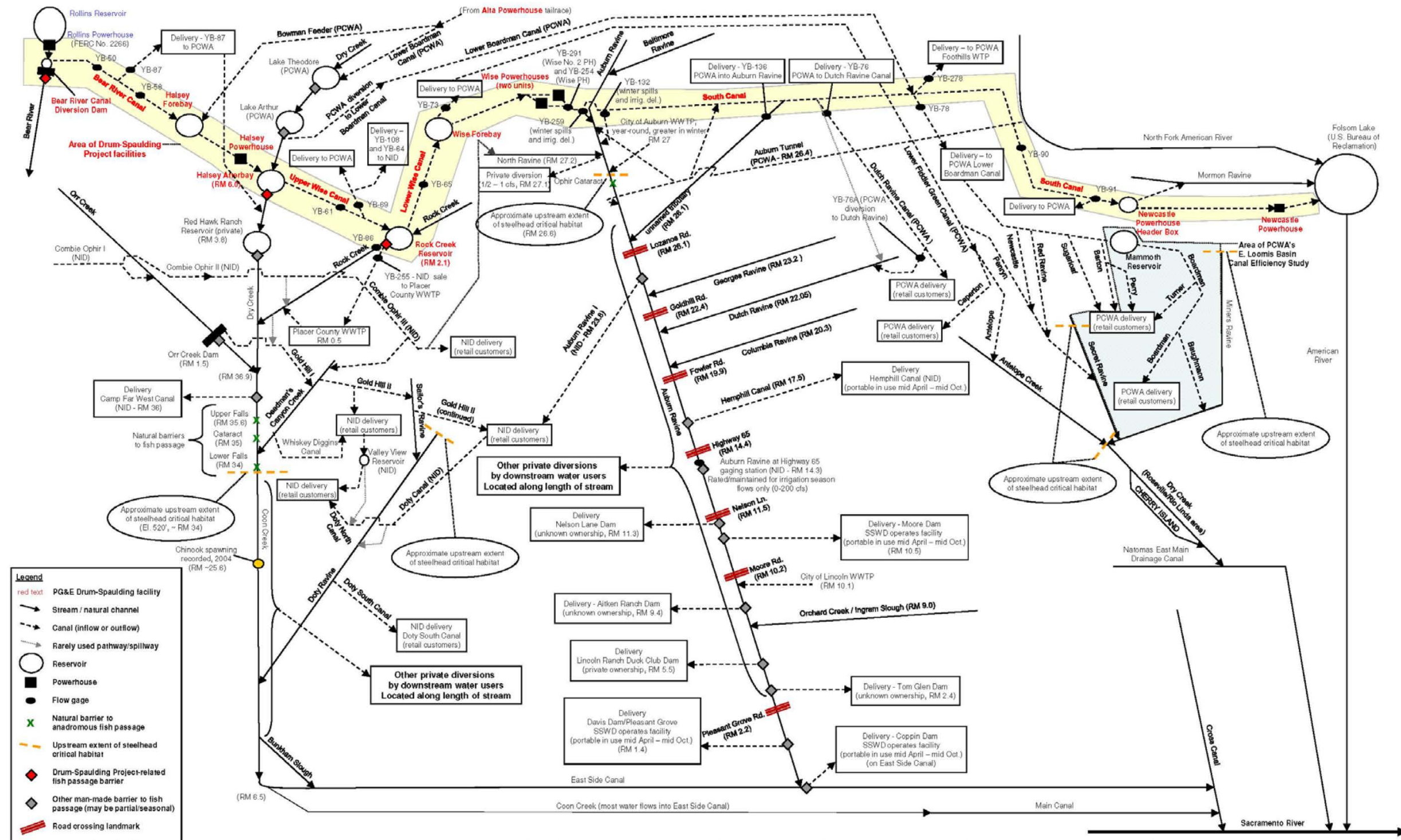


Figure 3-59. Schematic of Auburn Ravine showing relative location of major discharges and withdrawals affecting flows in Auburn Ravine.

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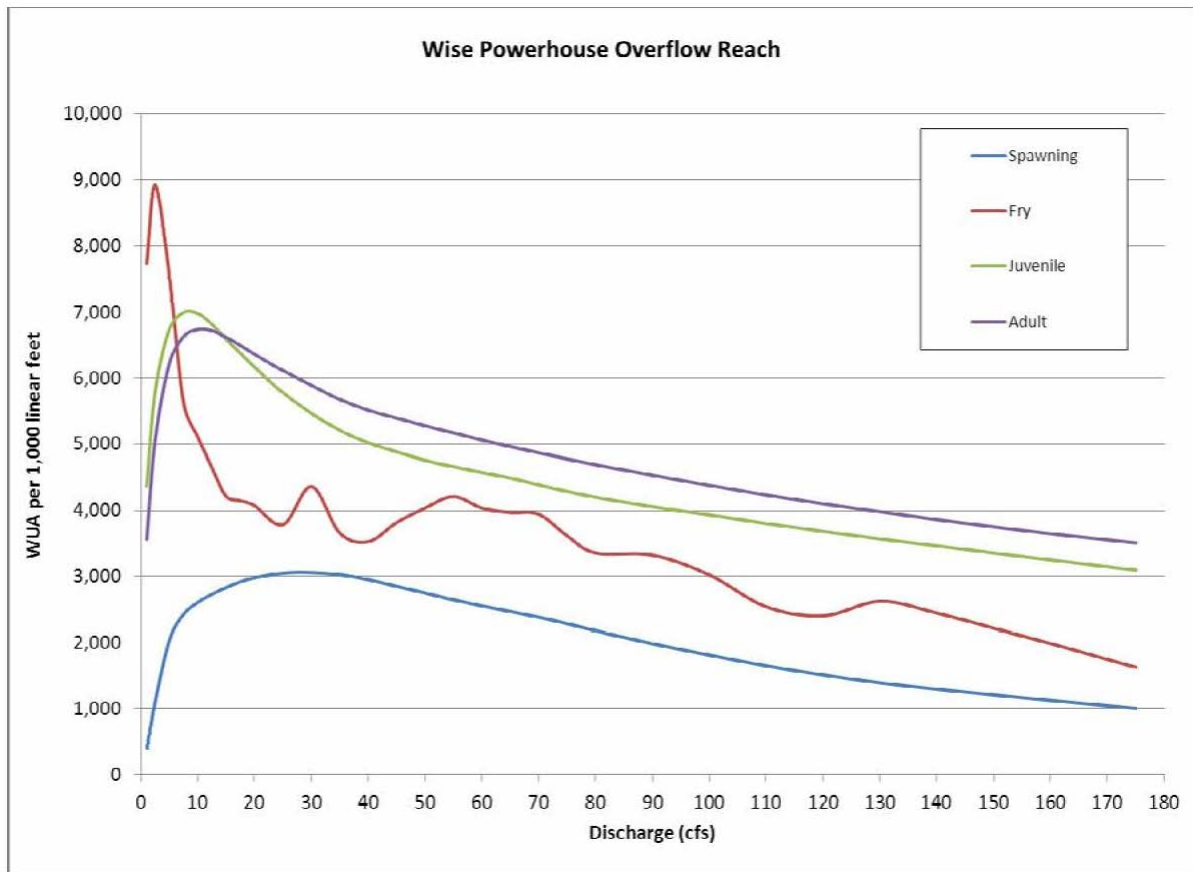


Figure 3-60. WUA for adult and juvenile rainbow trout and for rainbow trout spawning in the Auburn Ravine below Wise No. 1 and No. 2 powerhouses. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

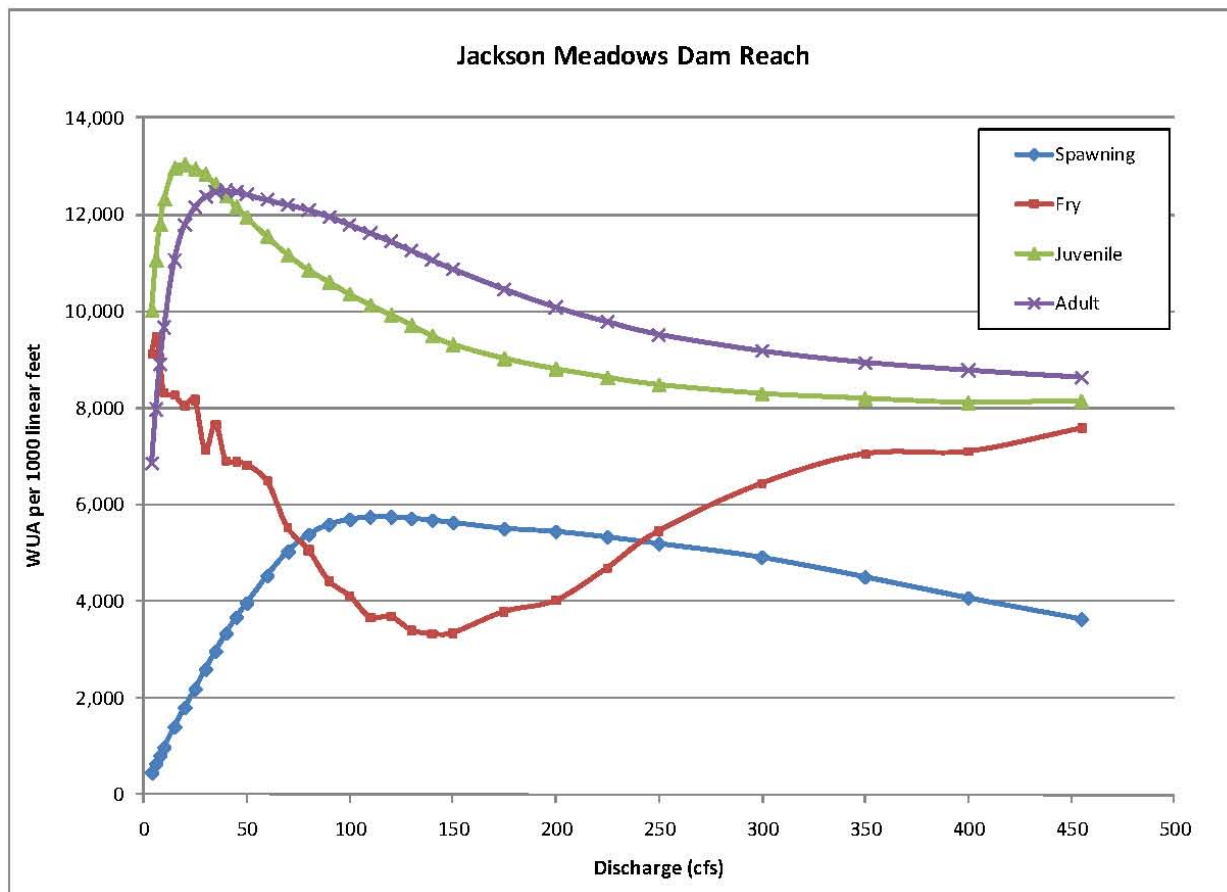


Figure 3-61. Modeled habitat suitability index (WUA) for rainbow trout, Middle Yuba River below Jackson Meadows reservoir dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

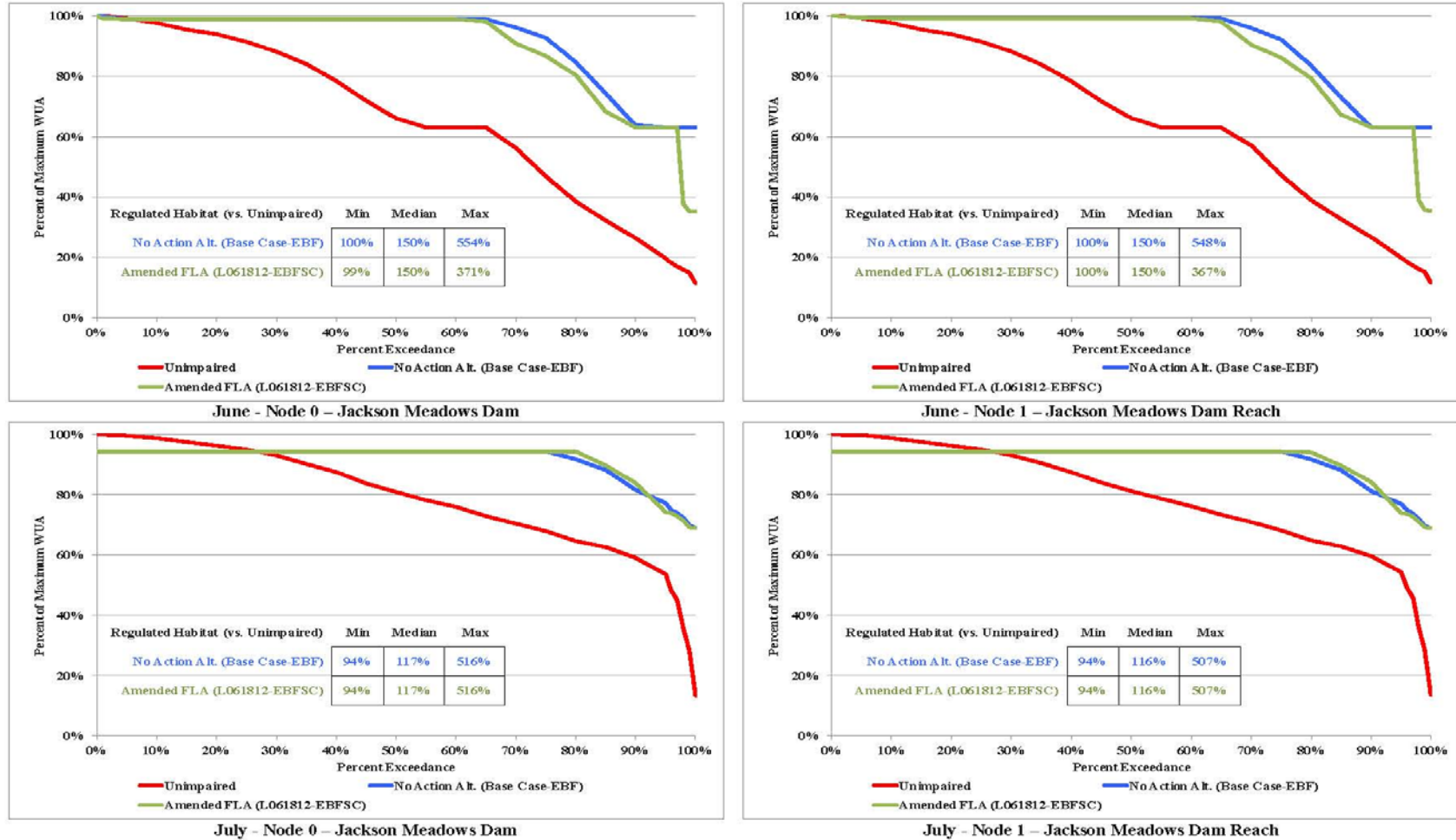


Figure 3-62. HEA for spawning rainbow trout during the month of June (i) and adult rainbow trout during the month of July (j) in Middle Yuba River below Jackson Meadows reservoir dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

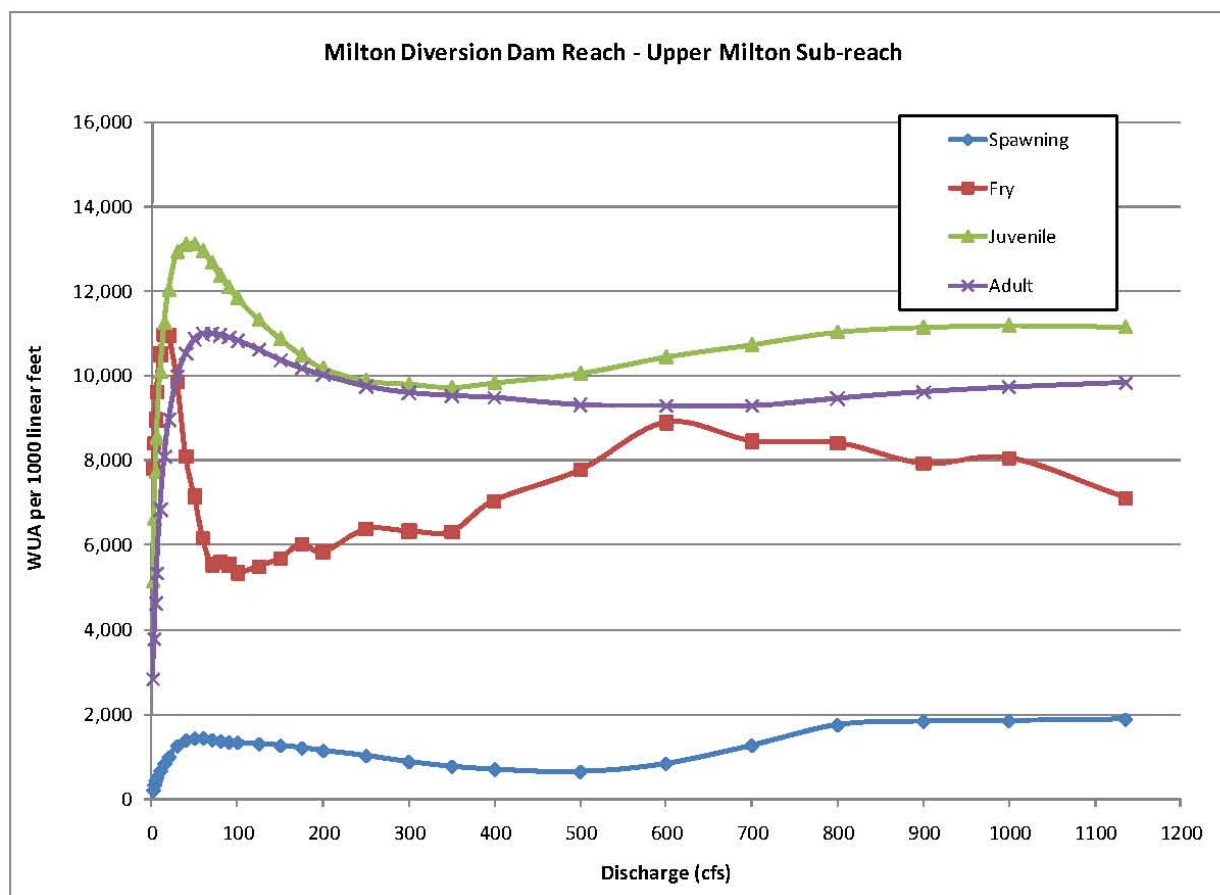


Figure 3-63. WUA for rainbow trout, Middle Yuba River below Milton diversion dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

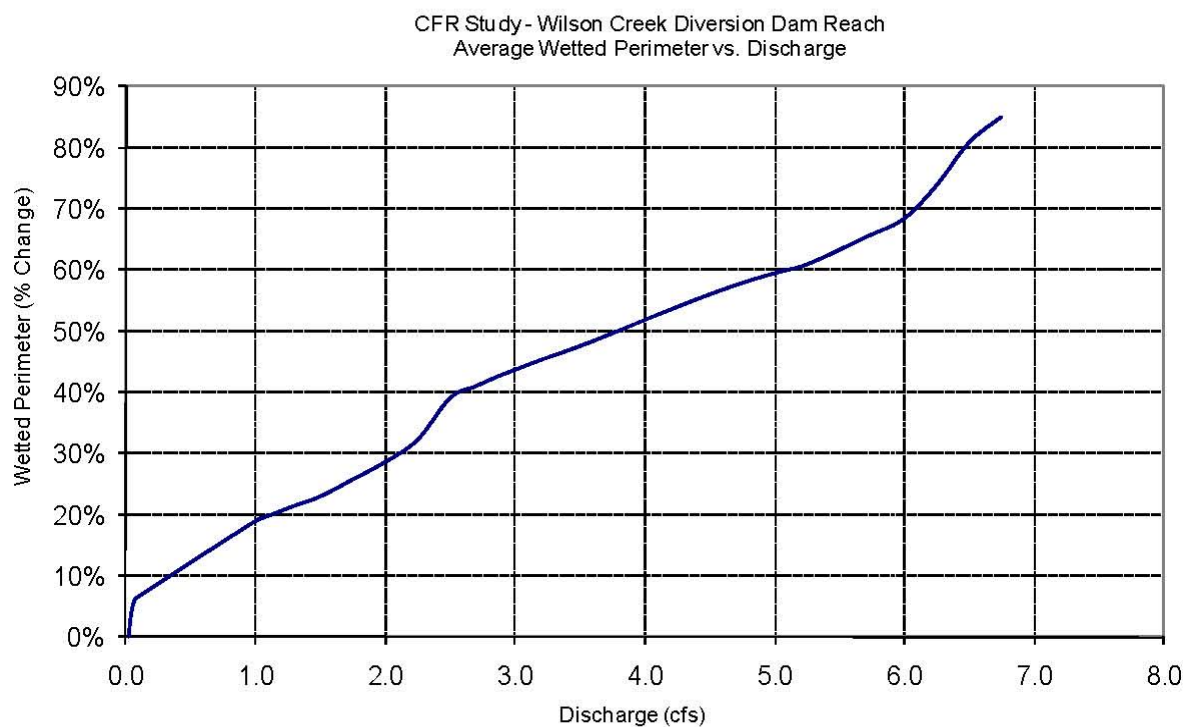


Figure 3-64. Percent change in wetted perimeter as a function of discharge in Wilson Creek below Wilson Creek diversion dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

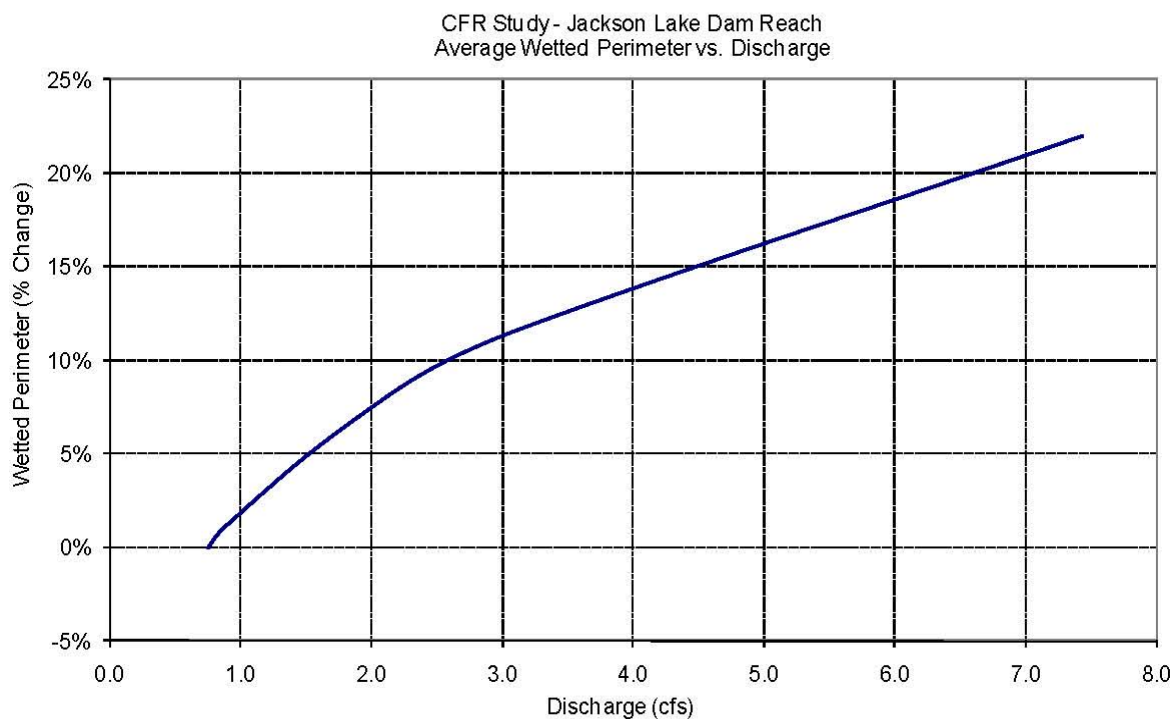


Figure 3-65. Percent change in wetted perimeter as a function of discharge in Jackson Creek below Jackson Lake dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

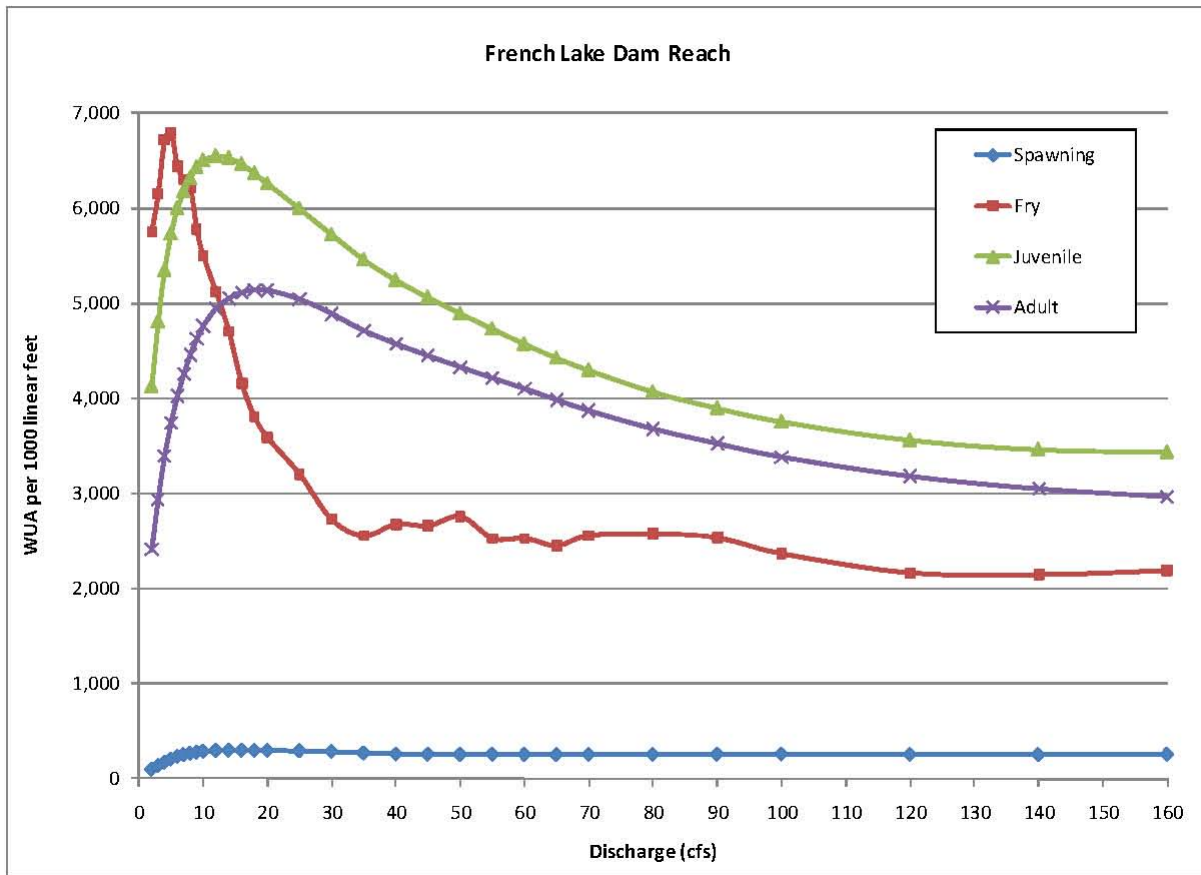


Figure 3-66. WUA for rainbow trout, Canyon Creek below French Lake dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

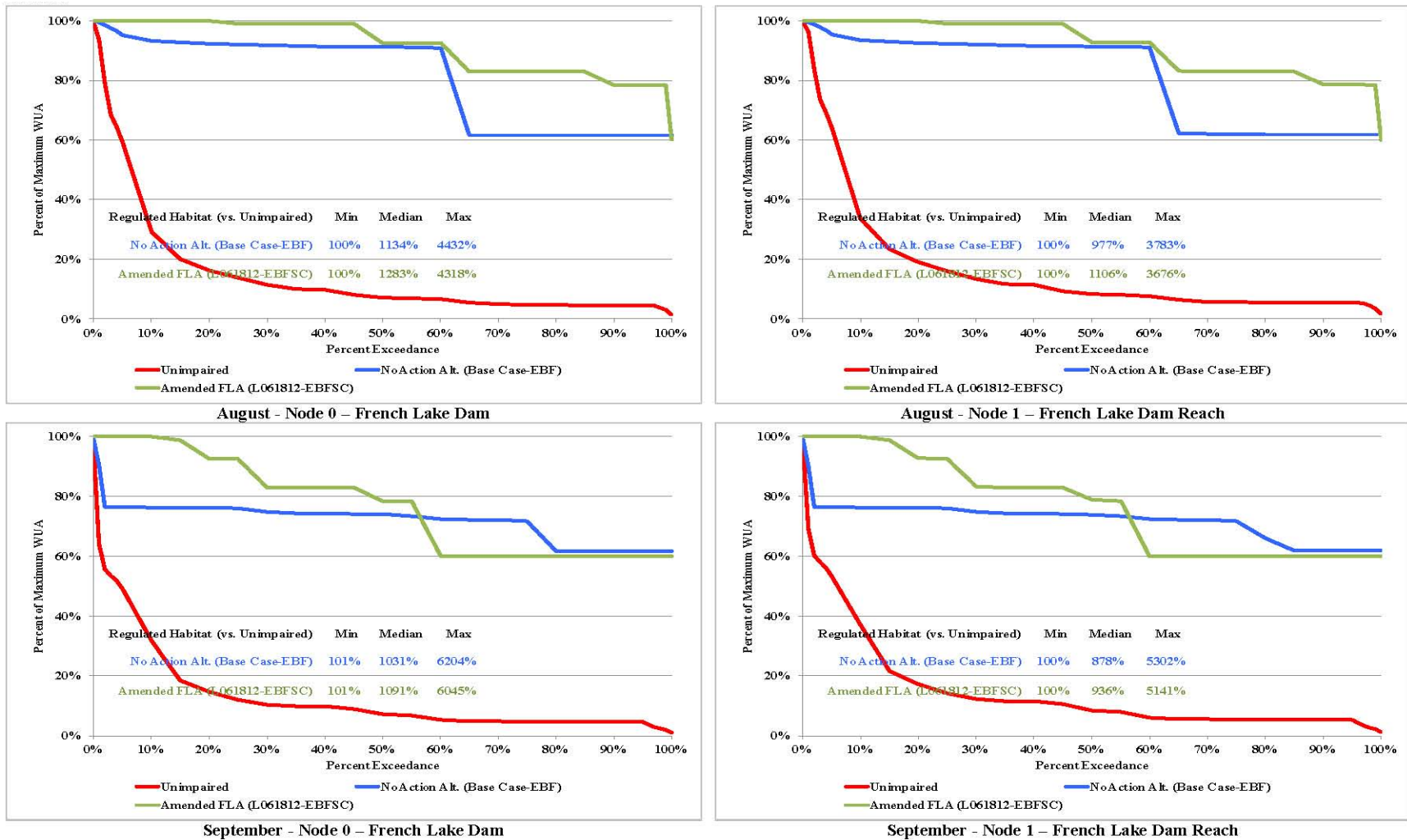


Figure 3-67. HEA for adult rainbow trout during the months of August and September in Canyon Creek below French Lake dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

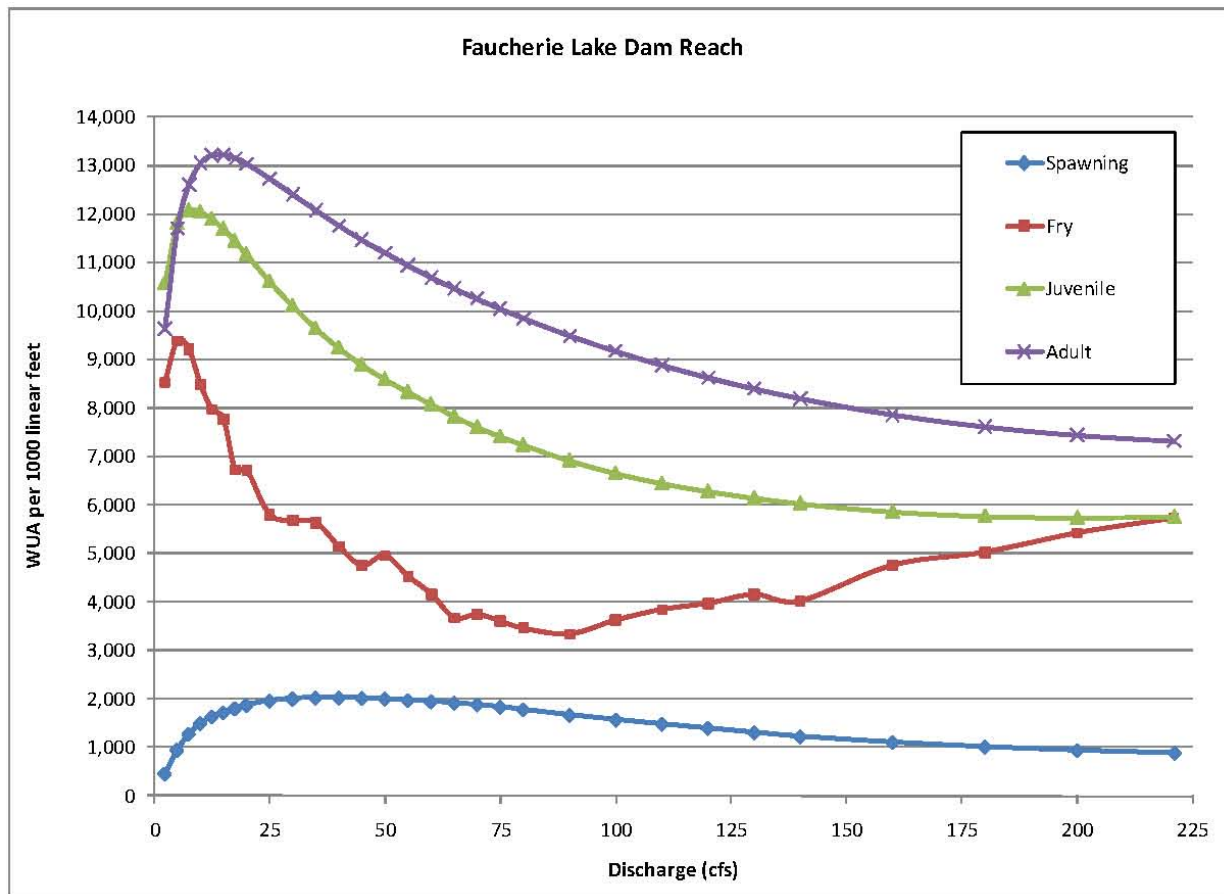


Figure 3-68. WUA for rainbow trout, Canyon Creek below Faucherie Lake dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

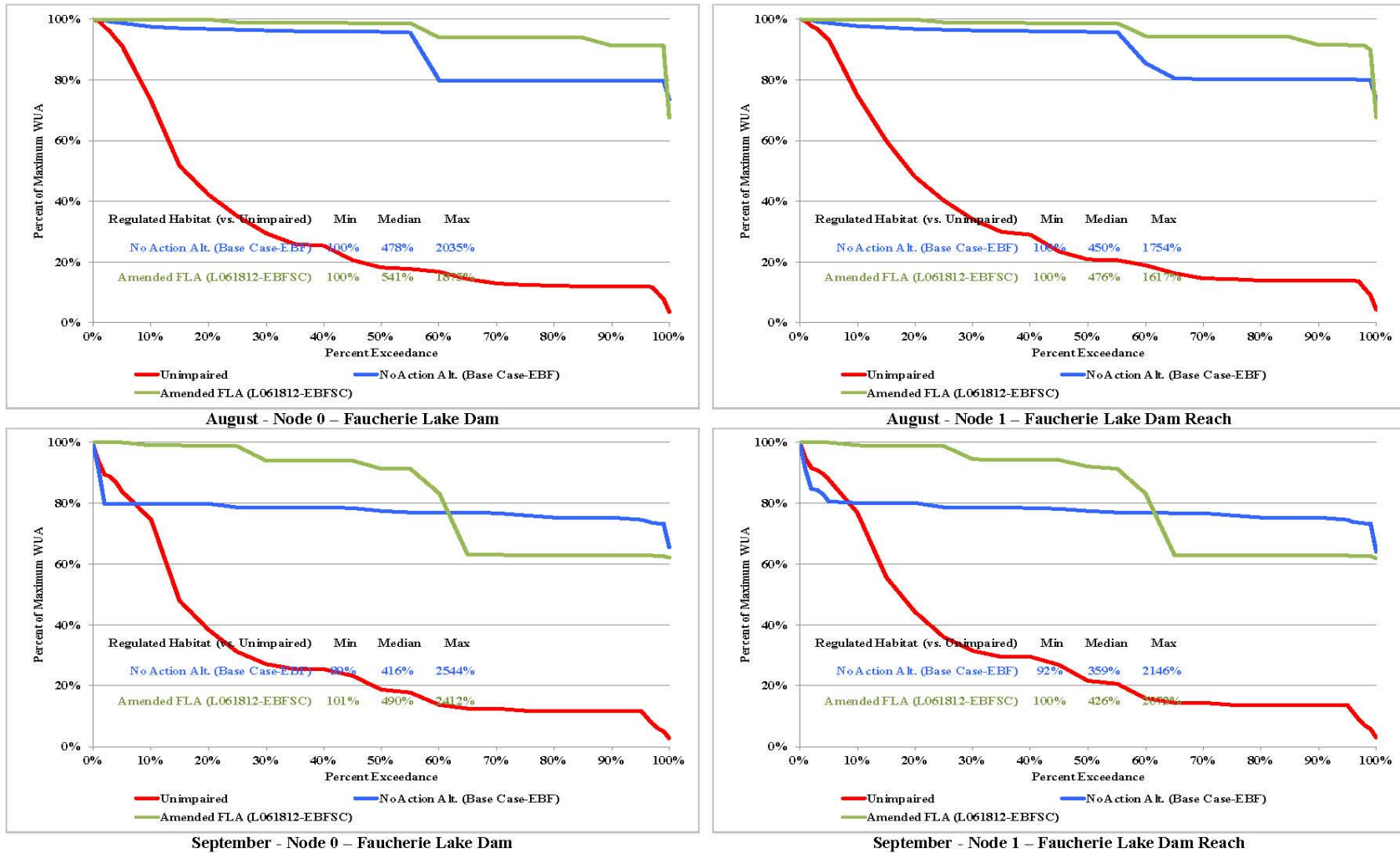


Figure 3-69. HEA for adult rainbow trout during the months of August (k) and September (l) in Canyon Creek below Faucherie Lake dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

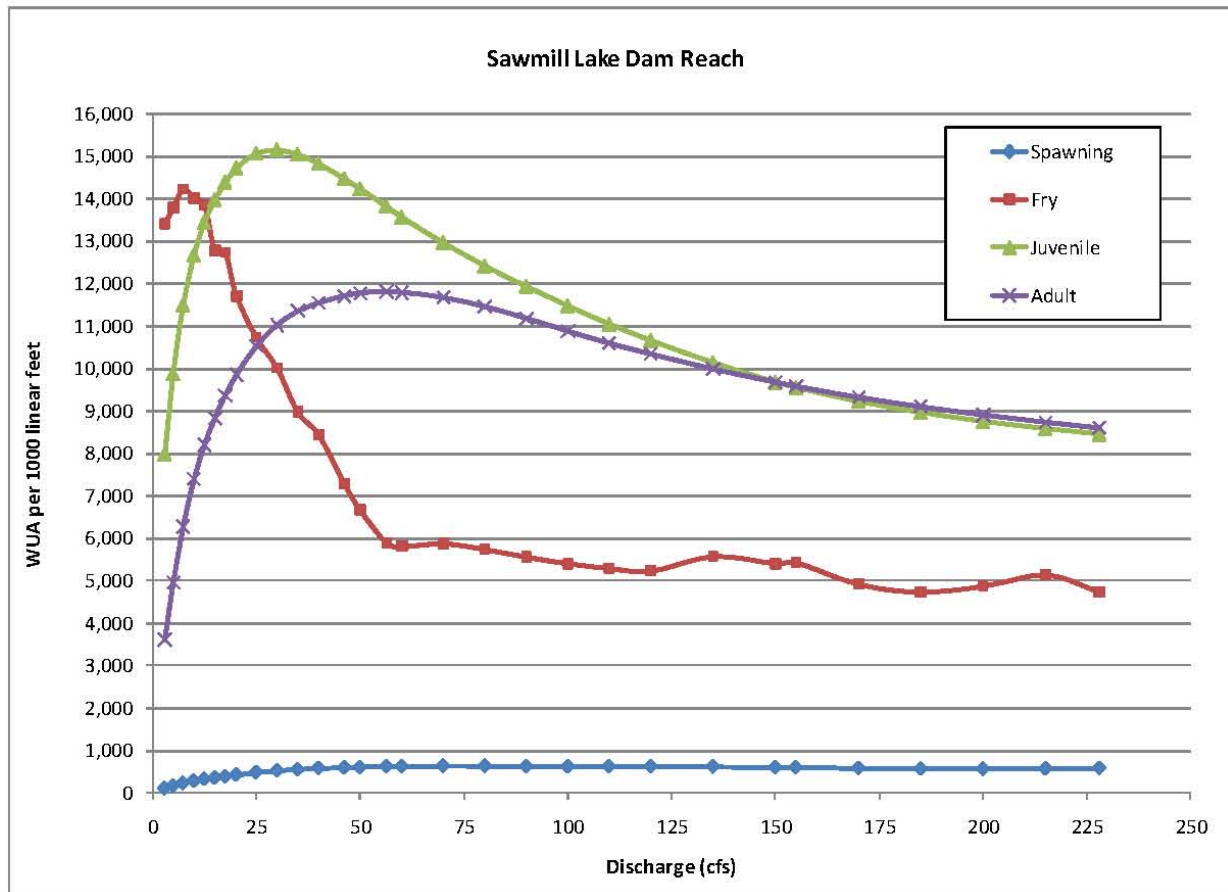


Figure 3-70. WUA for rainbow trout, Canyon Creek below Sawmill Lake dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

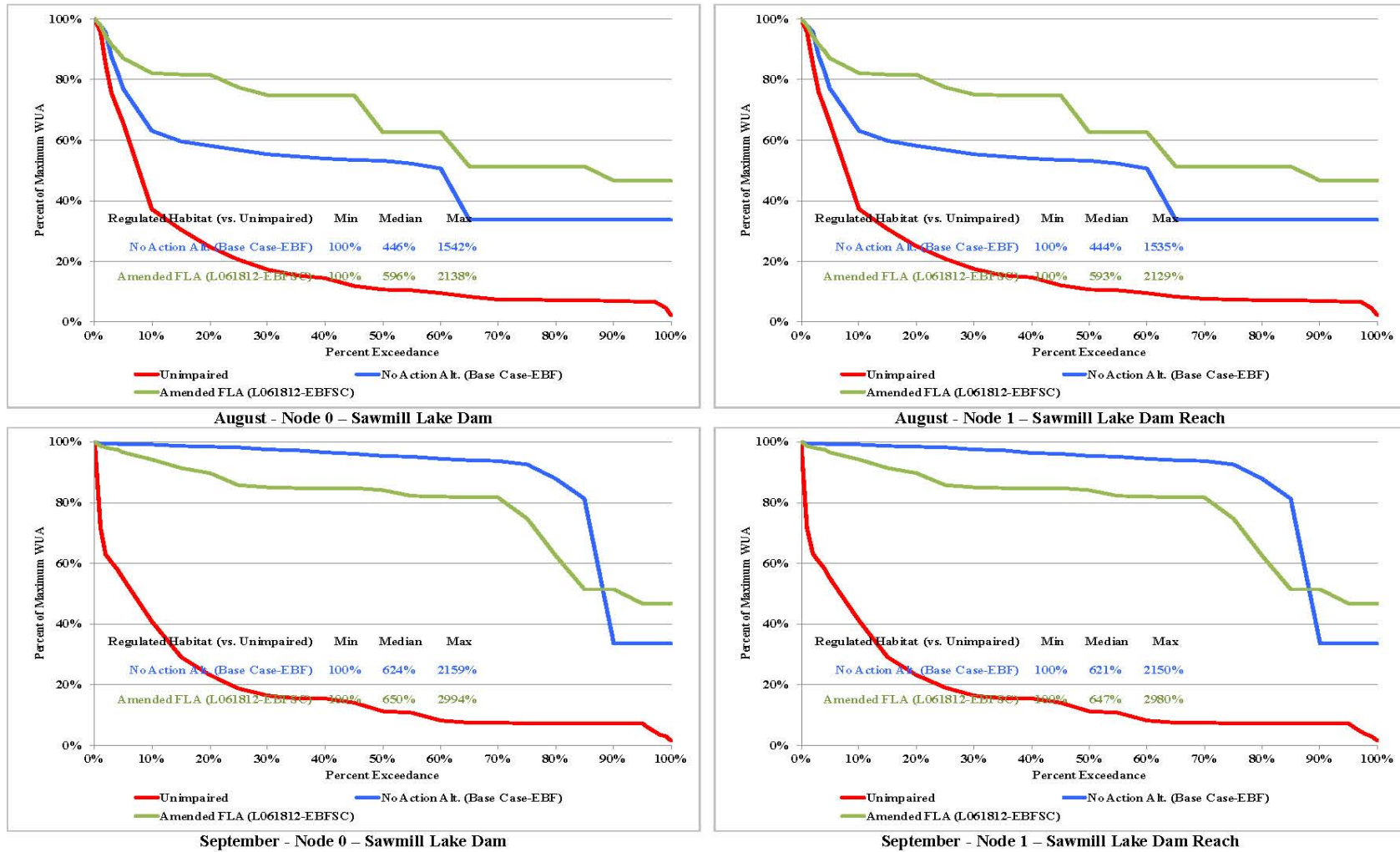


Figure 3-71. HEA for adult rainbow trout during the months of August (k) and September (l) in Canyon Creek below Sawmill Lake dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

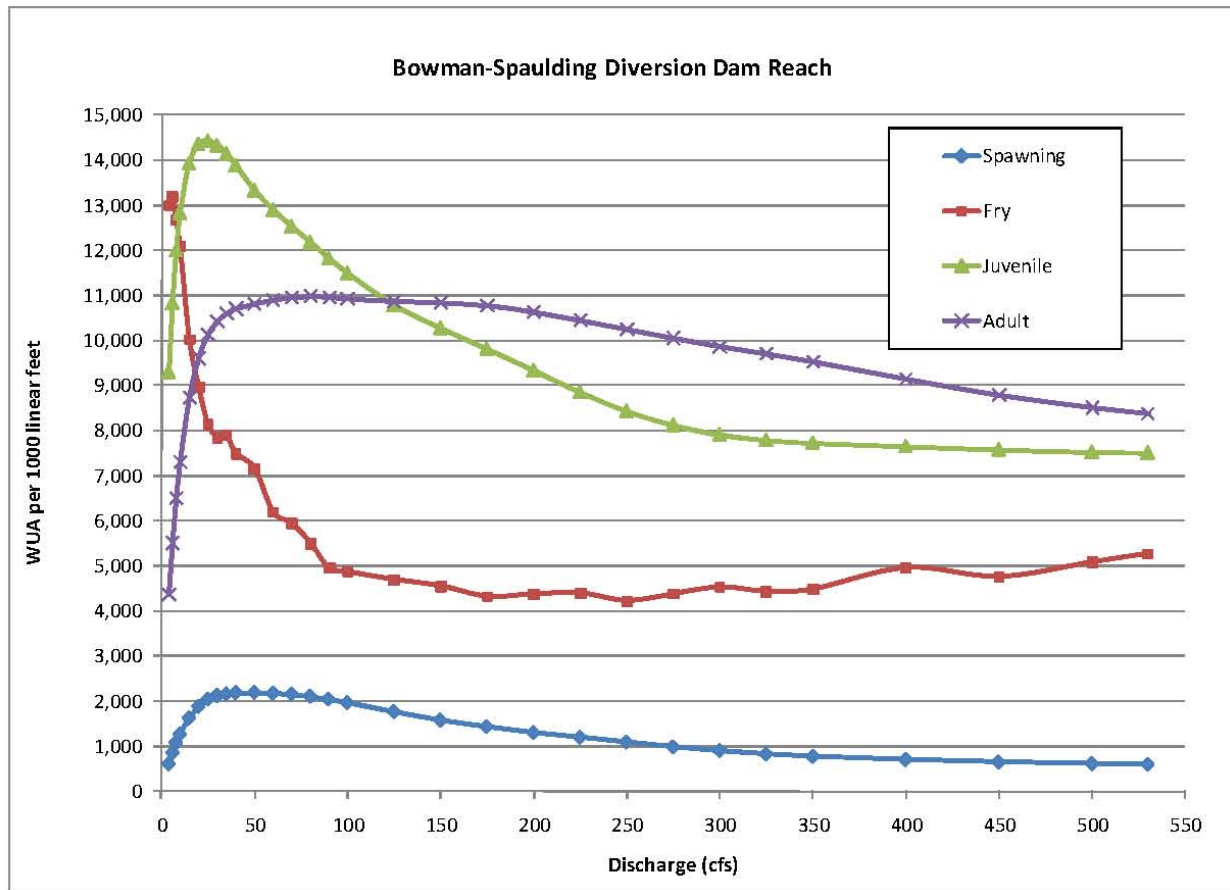


Figure 3-72. WUA for rainbow trout, Canyon Creek below Bowman-Spaulling diversion dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

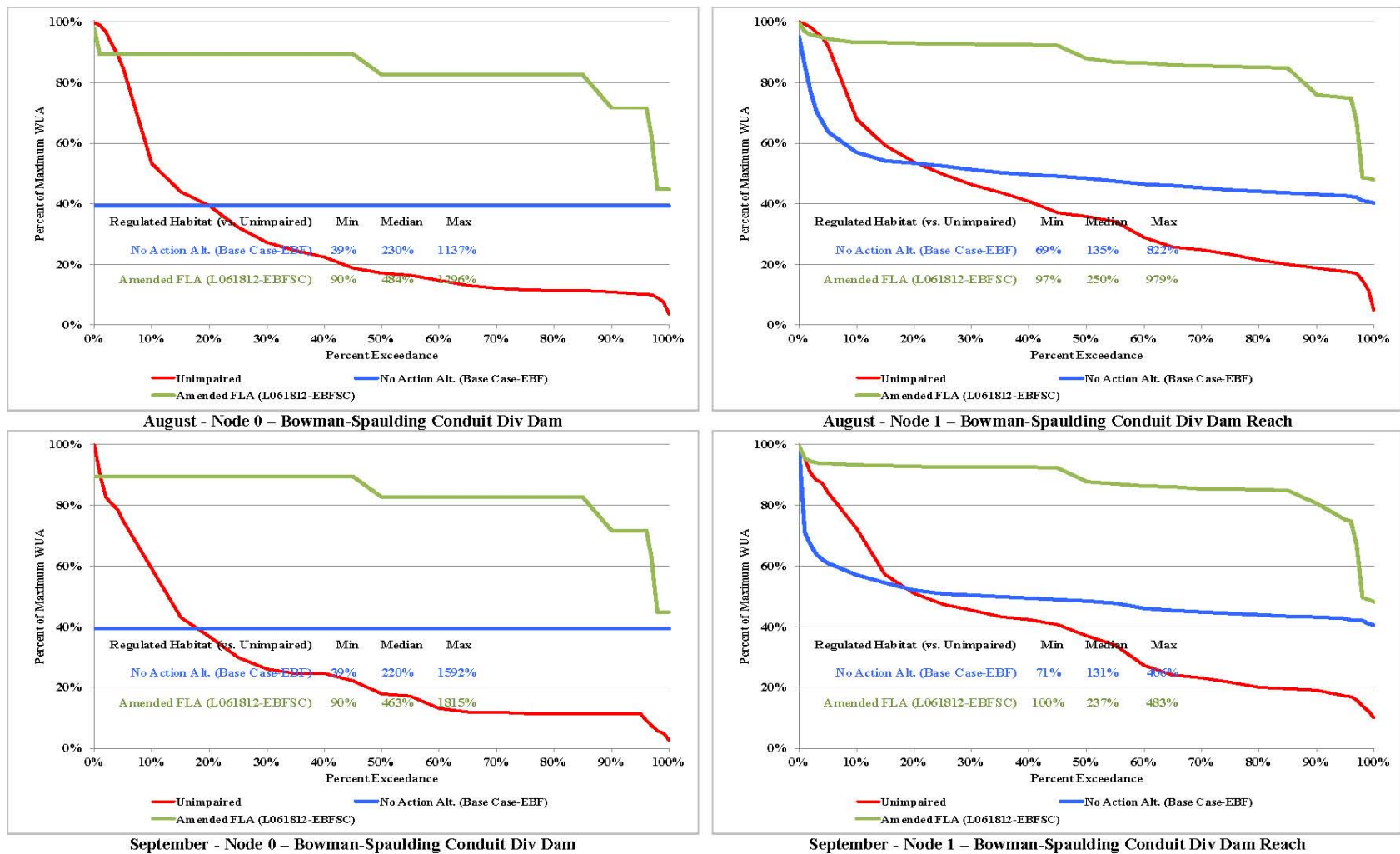


Figure 3-73. HEA for adult rainbow trout during the months of August (k) and September (l) in Canyon Creek below Bowman-Spaulding diversion dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

DFA Study - Texas Creek Diversion Dam Reach

Average Wetted Perimeter vs. Discharge

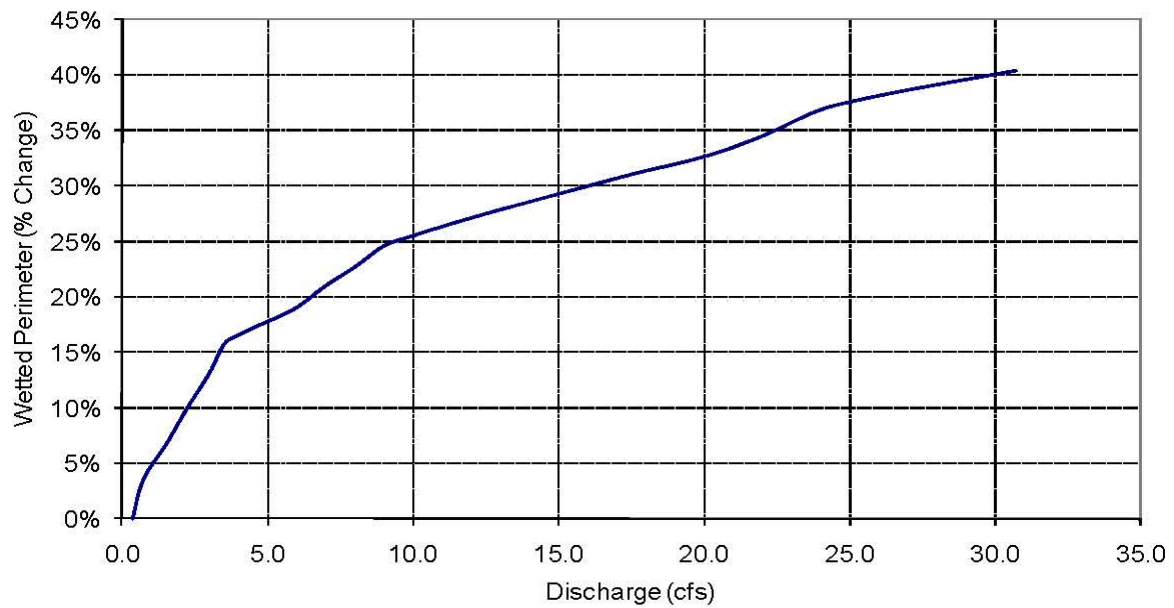


Figure 3-74. Percent change in wetted perimeter as a function of discharge in Texas Creek below Texas Creek diversion dam, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

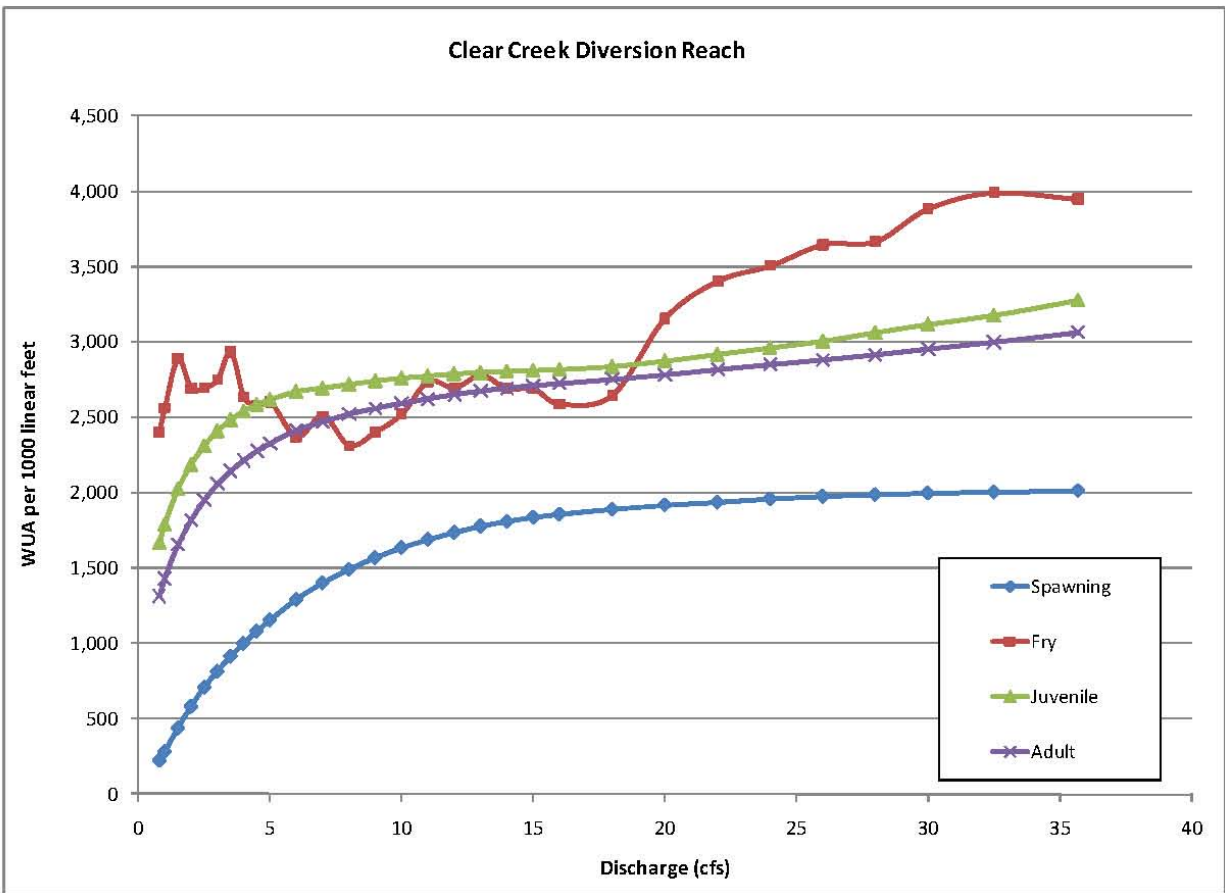


Figure 3-75. WUA for rainbow trout, Clear Creek below Bowman-Spaulding conduit. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

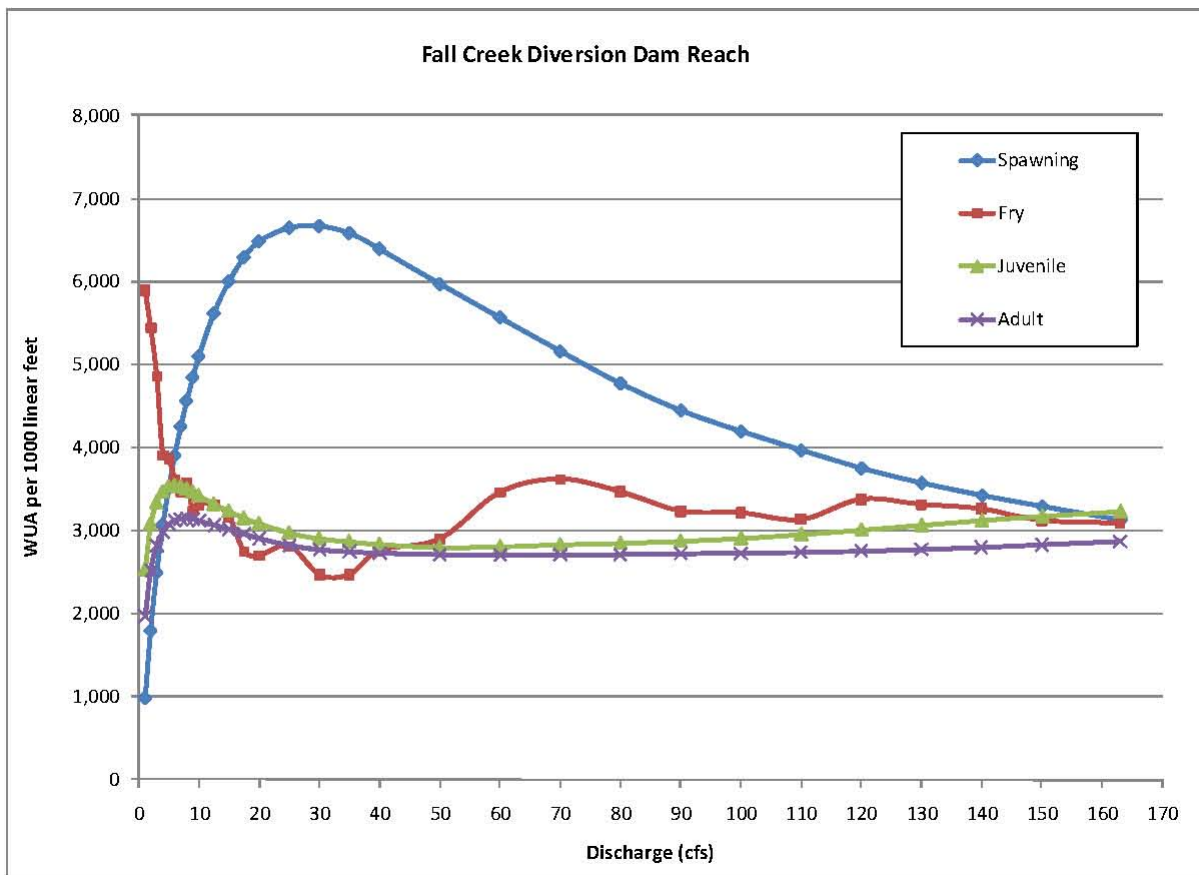


Figure 3-76. WUA for rainbow trout, Fall Creek below Fall Creek diversion dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

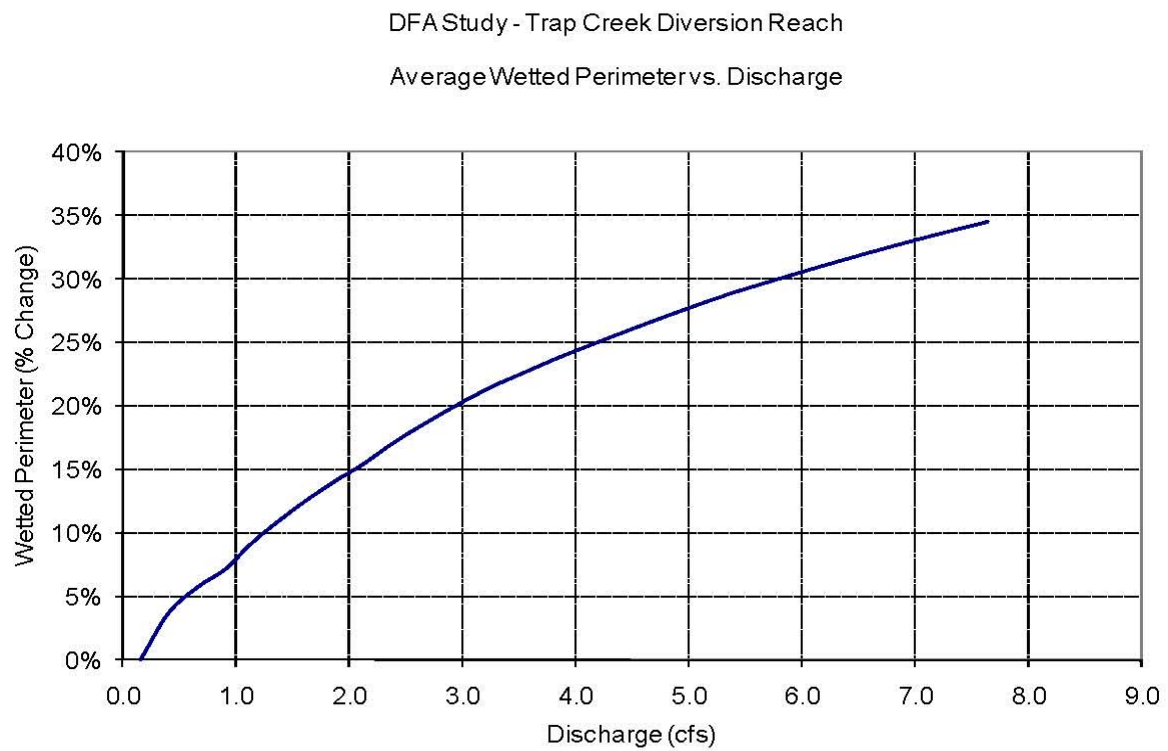


Figure 3-77. Percent change in wetted perimeter as a function of discharge in Trap Creek below Bowman-Spaulding conduit, averaged across three channel flow response transects. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

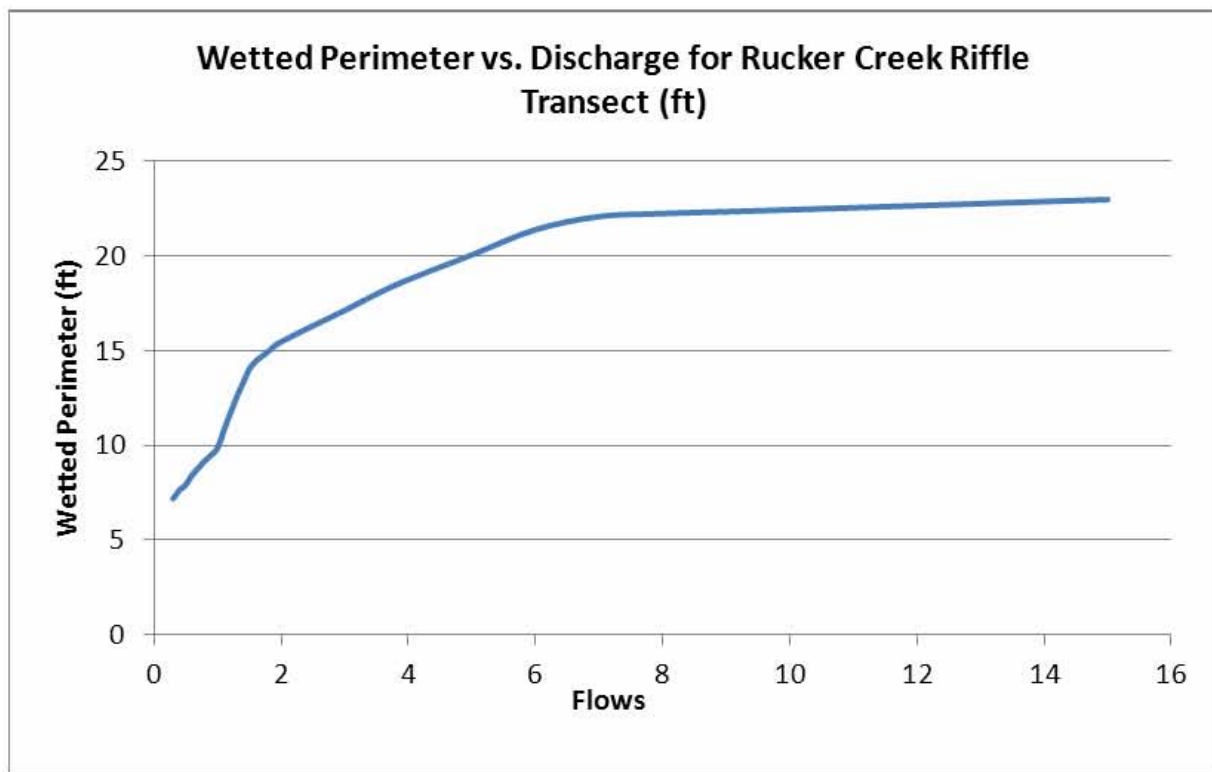


Figure 3-78. Wetted perimeter at the DFA Rucker Creek below Bowman Spaulding conduit riffle transect. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

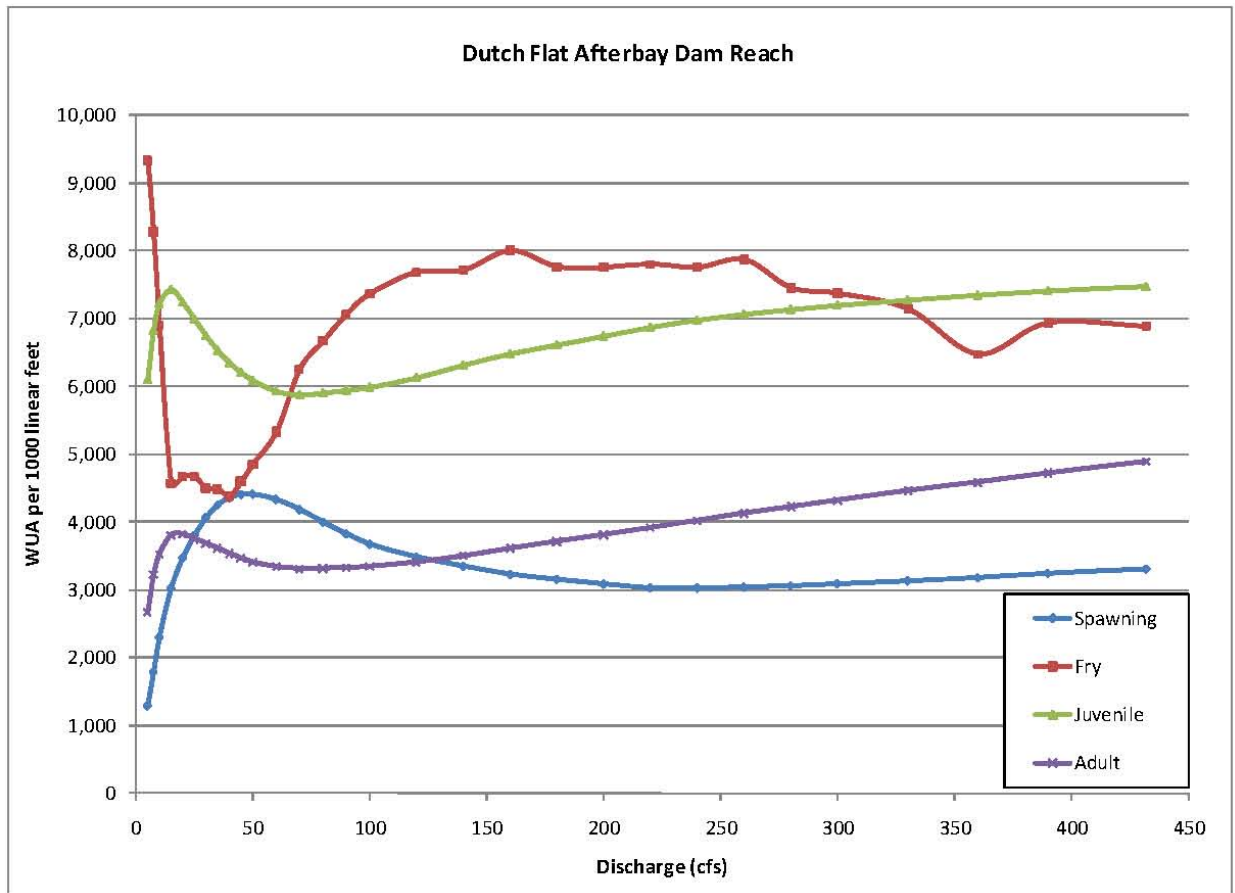


Figure 3-79. WUA for rainbow trout, Bear River below Dutch Flat afterbay dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)

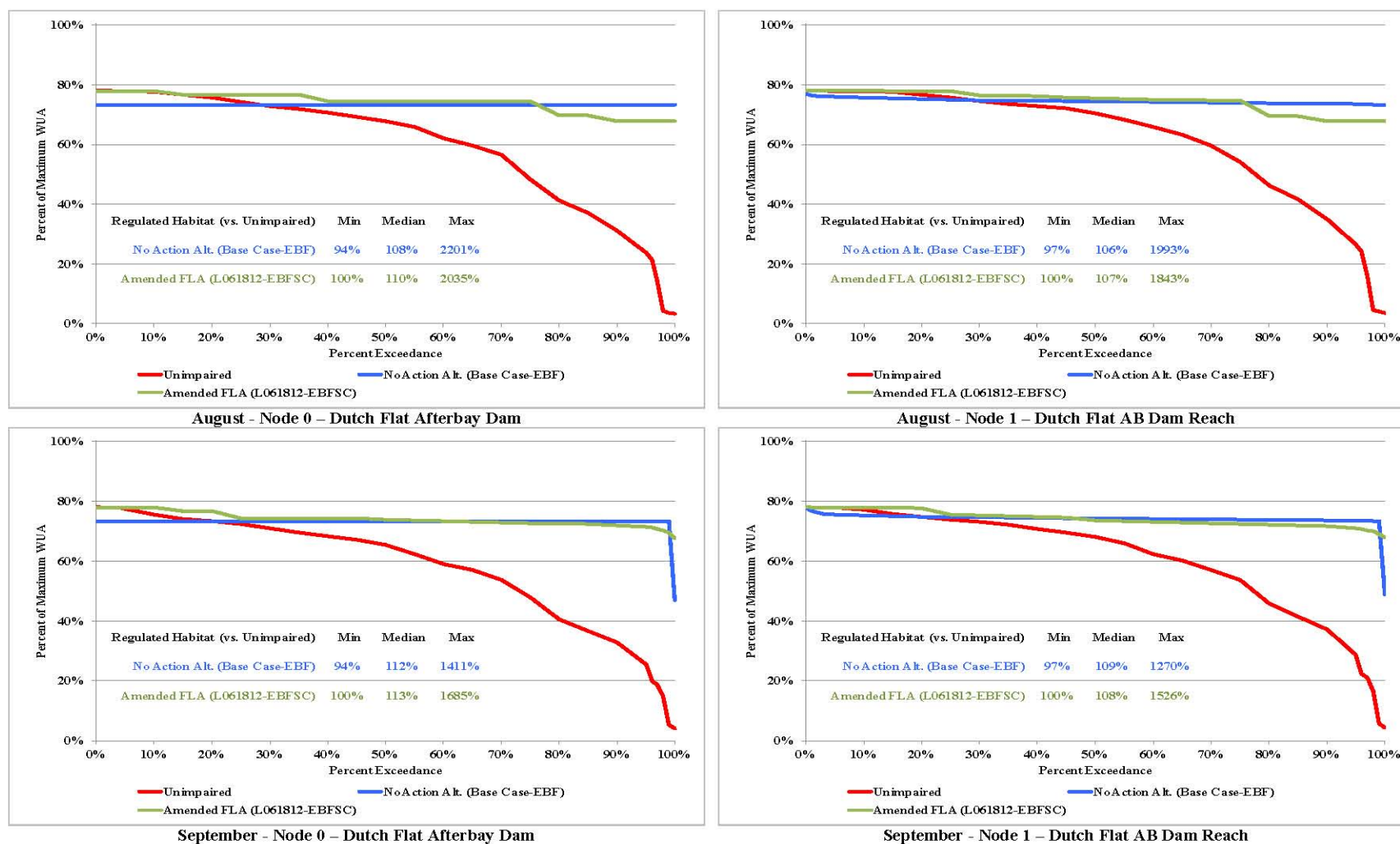


Figure 3-80. HEA for adult rainbow trout during the months of August and September in Bear River below Dutch Flat afterbay dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

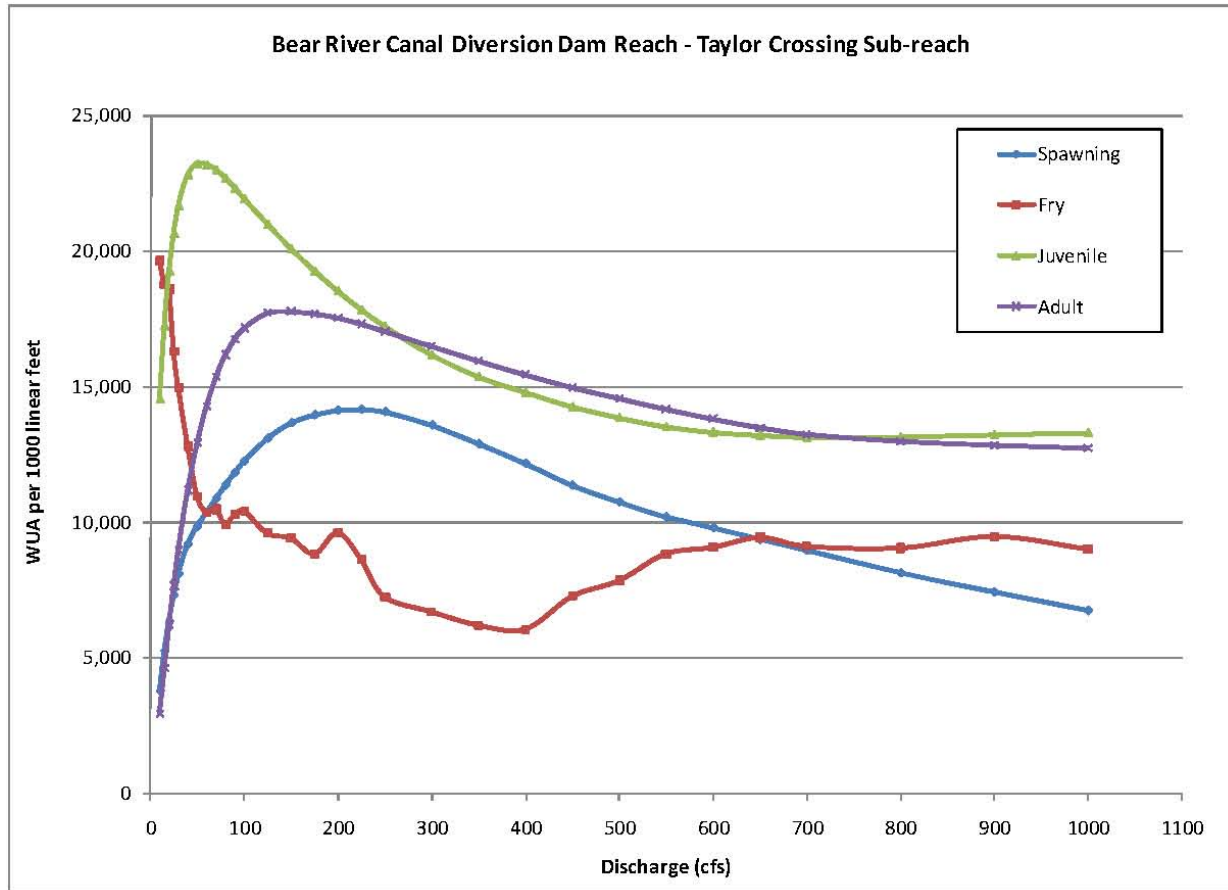
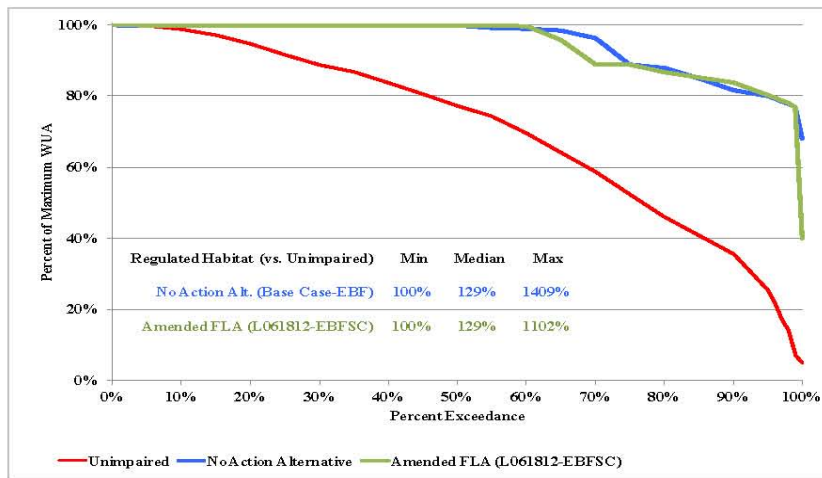
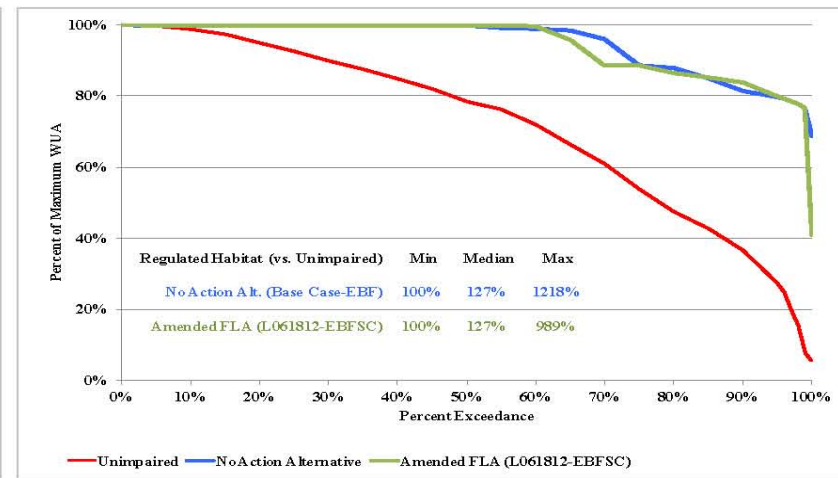


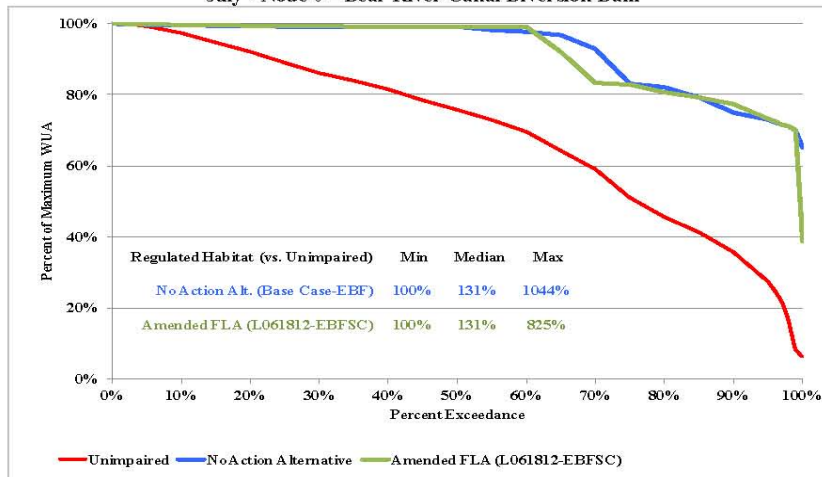
Figure 3-81. WUA for rainbow trout, Bear River below Rollins dam. (Source: Technical Memorandum 3-2, *Instream Flow*; NID and PG&E 2010)



July - Node 0 - Bear River Canal Diversion Dam



July - Node 1 - Taylor Crossing Sub-Reach



July - Node 2 - Dog Bar Sub-Reach

Figure 3-82. HEA for adult rainbow trout during the month of July in the Bear River below Rollins dam under historical streamflows based on the minimum streamflows in the existing license (no-action alternative, Base Case-EBF), proposed minimum streamflows (amended FLA, L061812-EBFSC), and estimated unregulated (unimpaired) streamflows. (Source: Supplement No. 3 to NID's License Application, as Amended [August 17, 2012])

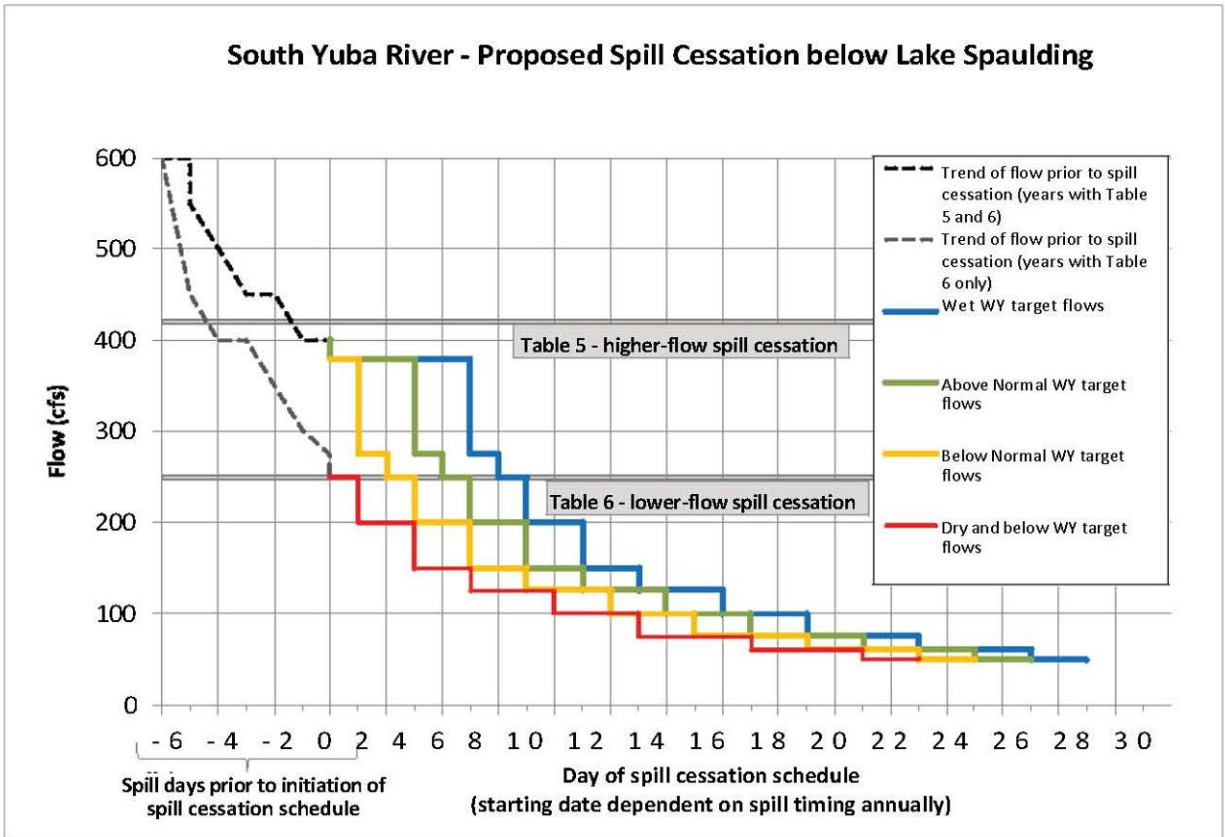


Figure 3-83. Proposed spill cessation flow schedules as shown in part 7 of measure DS-AQR1. (Source: PG&E 2011a)

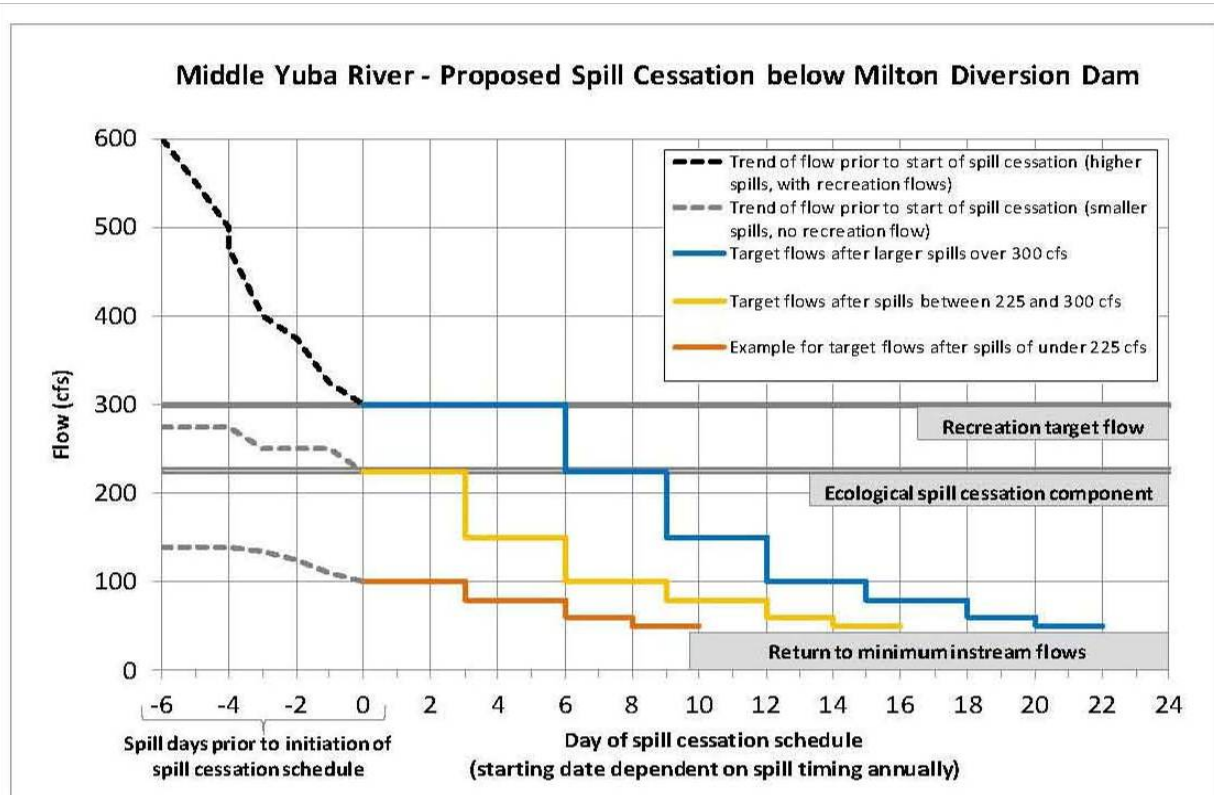


Figure 3-84. Spill cessation schedules for the Middle Yuba River below Milton diversion dam (including supplemental recreation flows for whitewater boating), as shown in part 7 of measure YB-AQR1 and measure YB-RR4. (Source: NID 2011a)

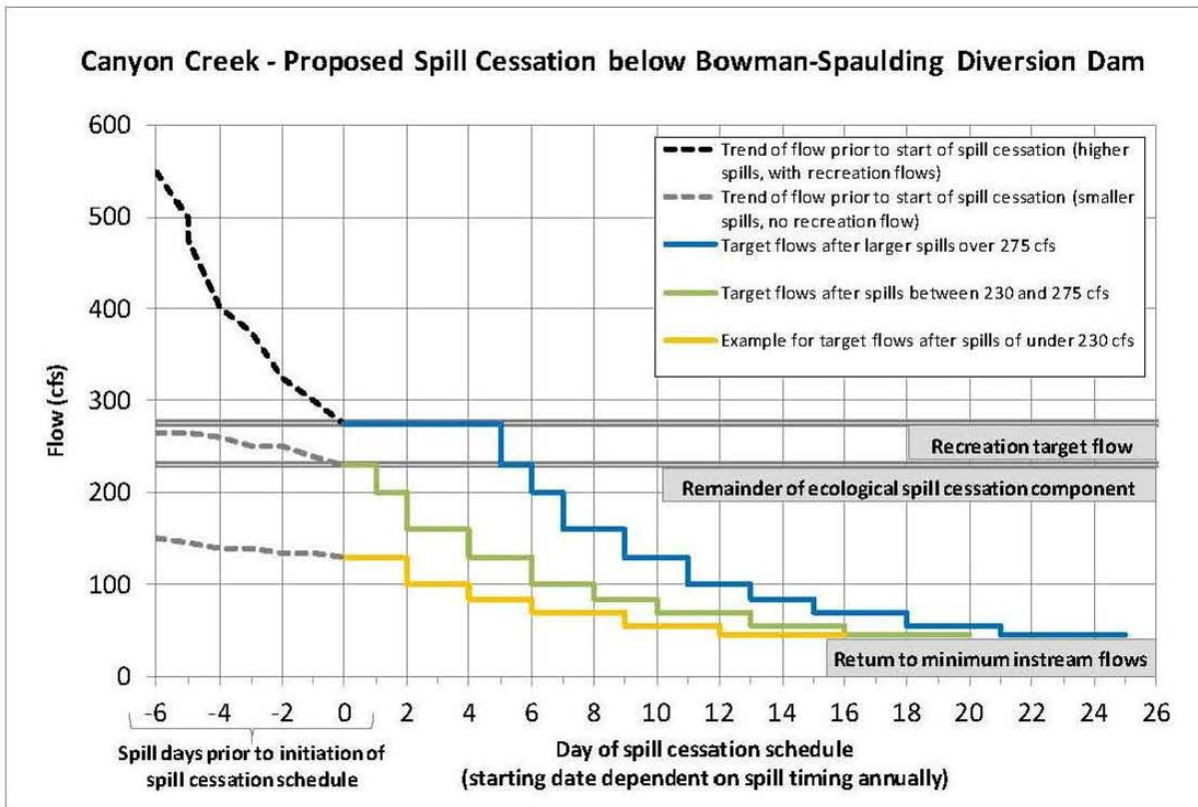


Figure 3-85. Proposed spill cessation flow schedules for Canyon Creek below Bowman-Spaulding diversion dam (including supplemental recreation flows for whitewater boating), as shown in part 7 of measure YB-AQR1 and measure YB-RR5. (Source: NID 2011a)

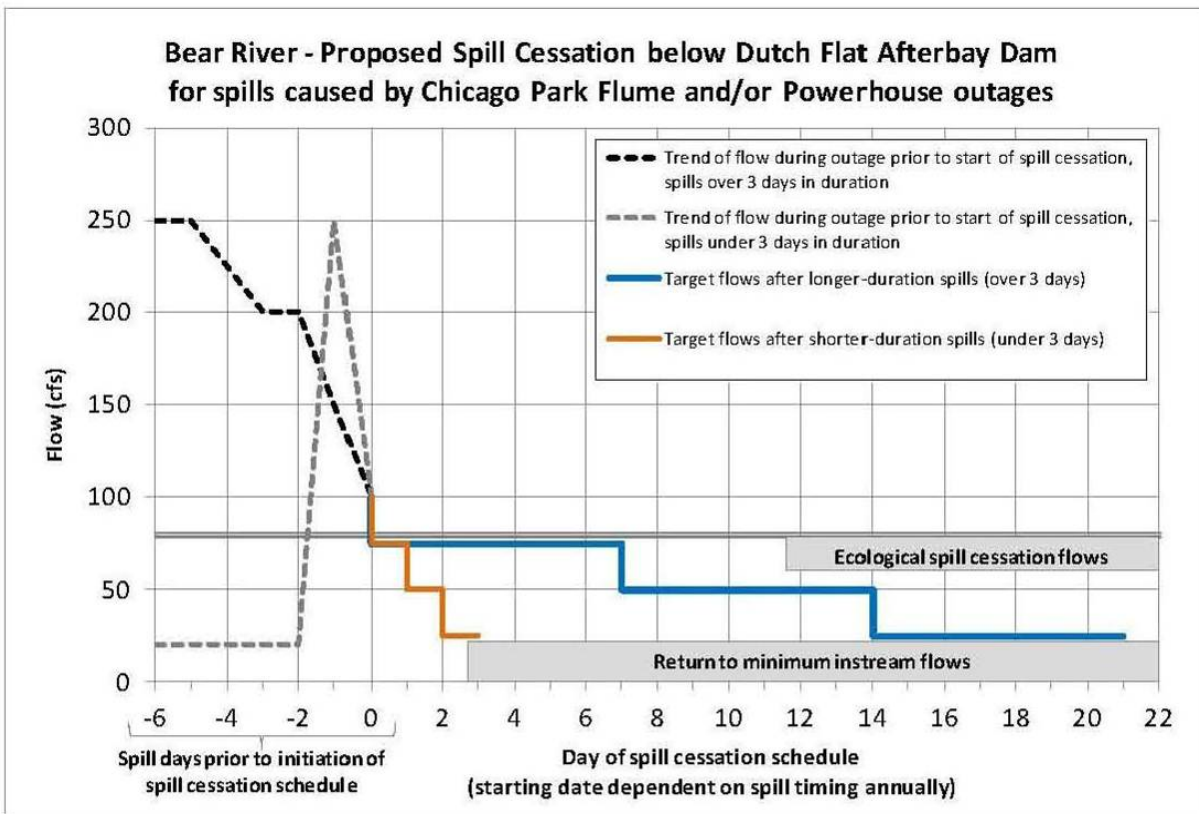


Figure 3-86. Proposed spill cessation flow schedules for Bear River below the Dutch Flat afterbay dam, for licensee-caused spills resulting from Chicago Park flume and/or powerhouse outages, as shown in part 7 of measure YB-AQR1. (Source: NID 2011a)

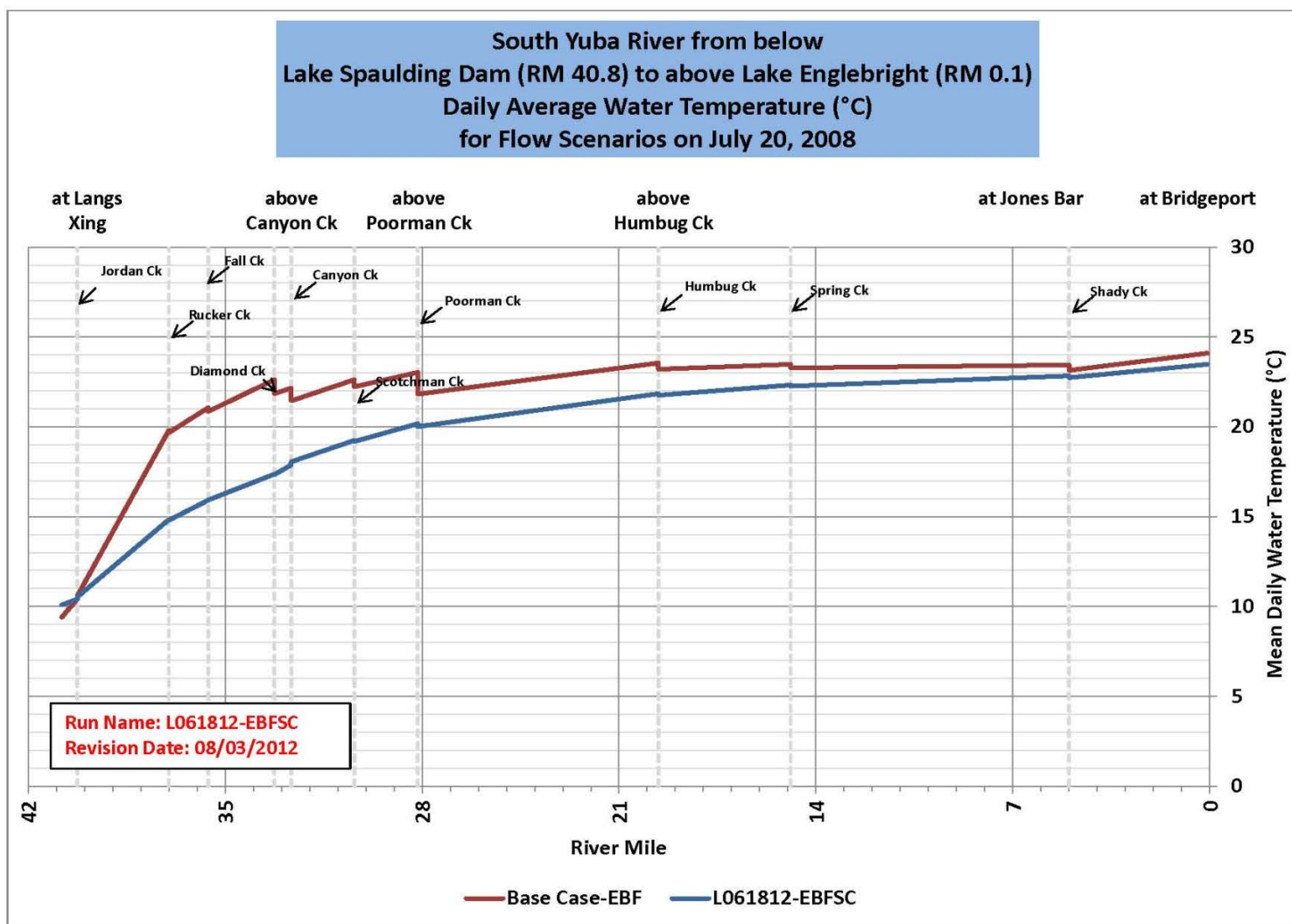


Figure 3-87. Daily average water temperature (°C) South Yuba River below Lake Spaulding dam (RM 40.8) to above Lake Englebright (RM 0.1) on July 20, 2008 for existing license streamflow conditions (Base Case-EBF model run) and minimum streamflow proposed by PG&E and relicensing stakeholders (L061812-EBFSC). (Source: PG&E *Supplement 4 to Amended License Application*; PG&E, August 30, 2012)

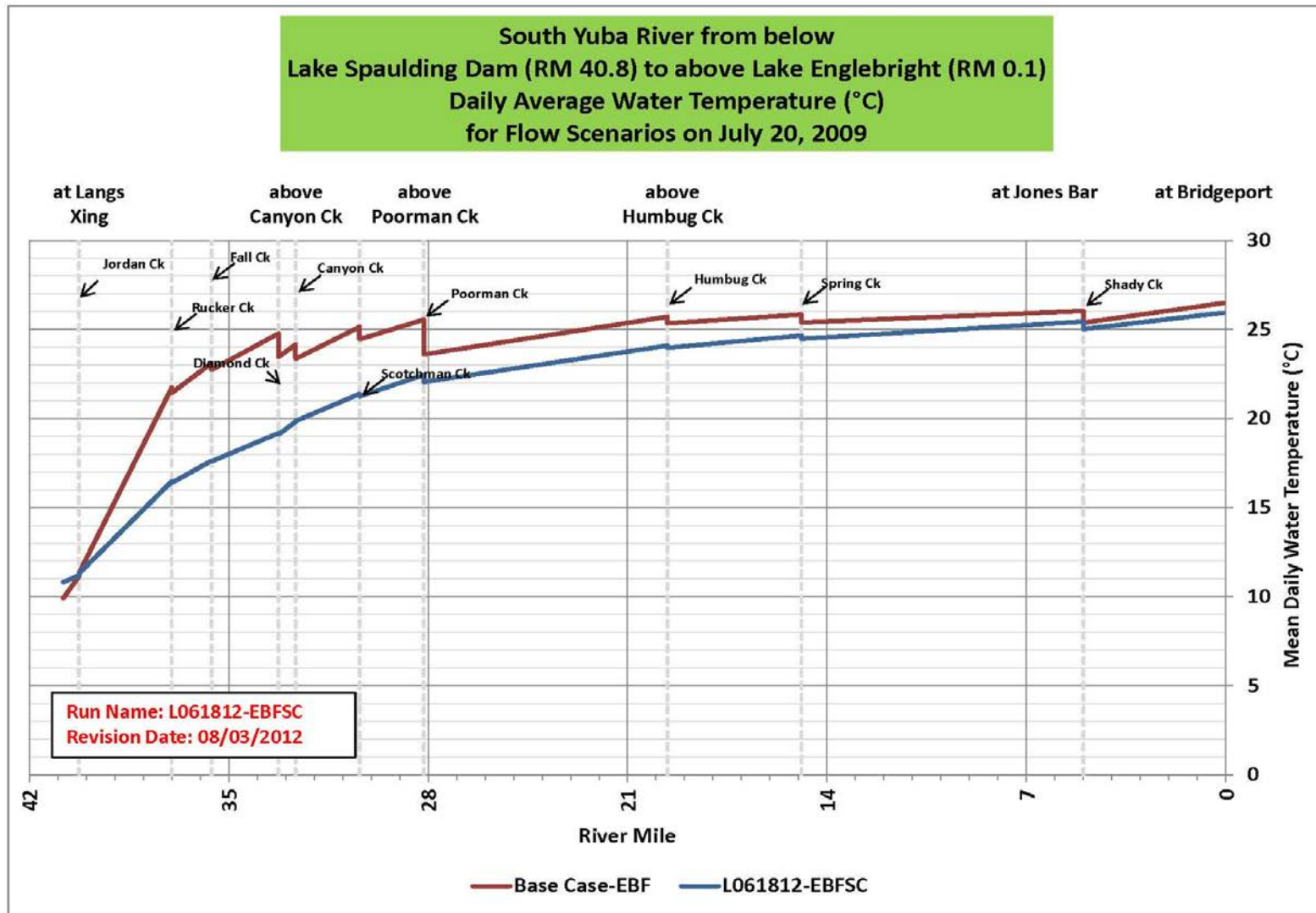


Figure 3-88. Daily average water temperature (°C) South Yuba River below Lake Spaulding dam (RM 40.8) to above Lake Englebright (RM 0.1) on July 20, 2009 for existing license streamflow conditions (Base Case-EBF model run) and minimum streamflow proposed by PG&E and relicensing stakeholders (L061812-EBFSC). (Source: *Supplement 4 to Amended License Application*; PG&E, August 30, 2012)

South Yuba River above Canyon Creek (RM 32.5/WT22)
Average Daily Water Temperature (°C)
for Flow Scenarios during June 1 to September 30, 2008

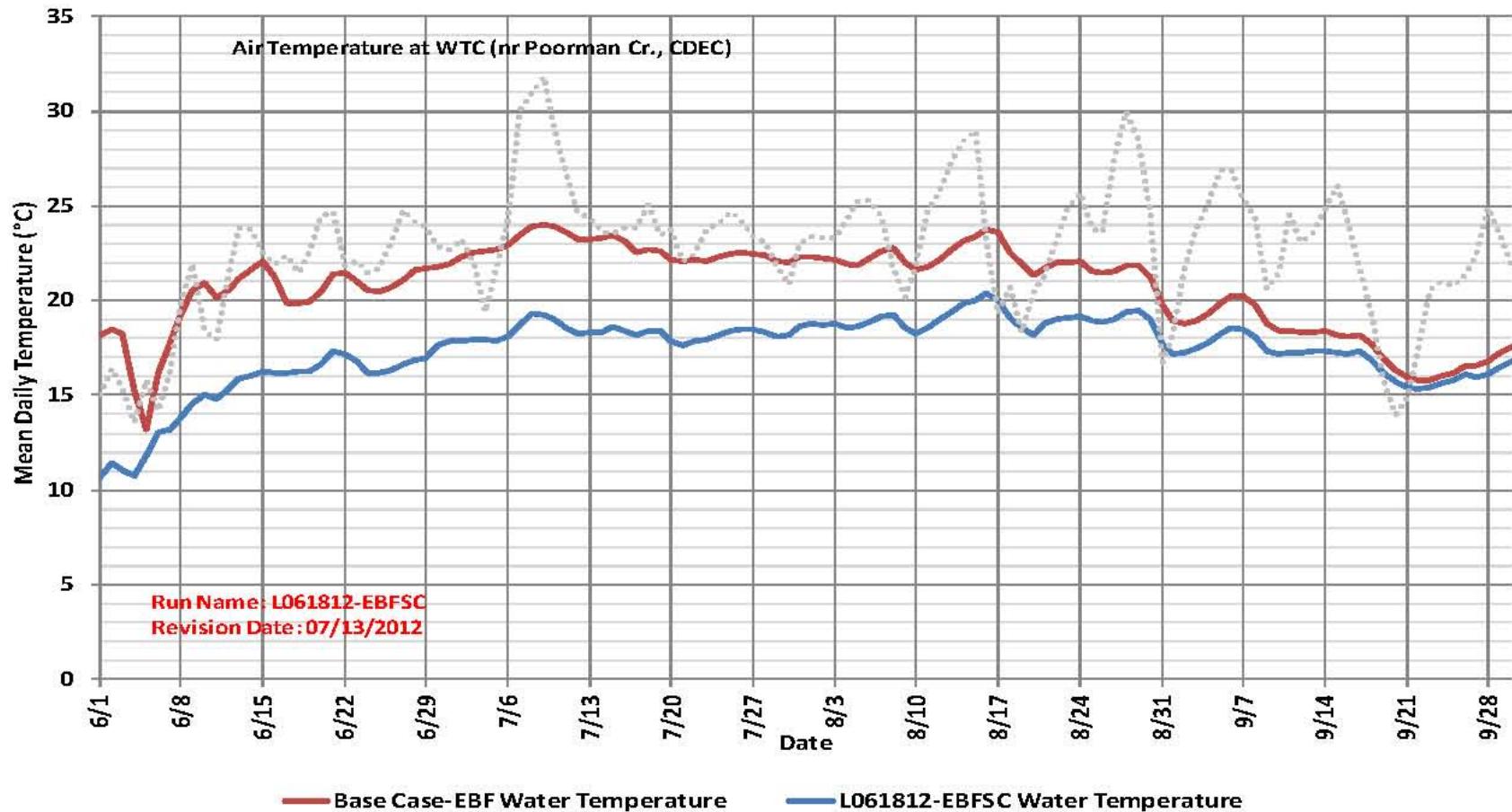


Figure 3-89. Modeled mean daily water temperatures under minimum streamflows proposed by PG&E and relicensing stakeholders (LO61812-EBFSC model run) for June through September 2008 in South Yuba River above the confluence with Canyon Creek compared to existing license minimum streamflow conditions (Base Case-EBF model run). (Source: *Supplement 4 to Amended License Application*; PG&E, August 30, 2012)

South Yuba River above Canyon Creek (RM 32.5/WT22)
Average Daily Water Temperature (°C)
for Flow Scenarios during June 1 to September 30, 2009

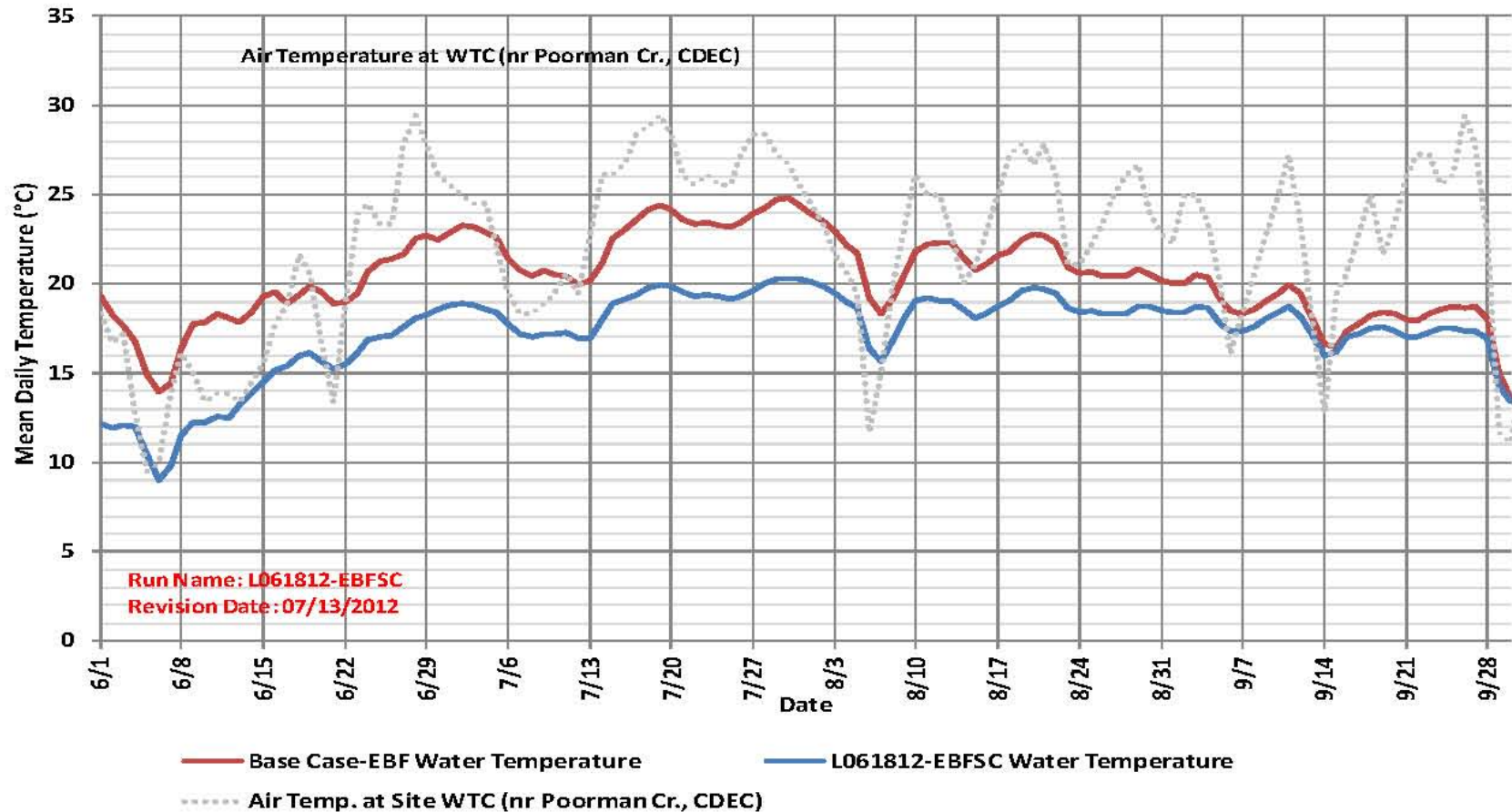


Figure 3-90. Modeled mean daily water temperatures under minimum streamflows proposed by PG&E and relicensing stakeholders (LO61812-EBFSC model run) for June through September 2009 in South Yuba River above the confluence with Canyon Creek compared to existing license minimum streamflow conditions (Base Case-EBF model run). (Source: *Supplement 4 to Amended License Application*; PG&E, August 30, 2012)

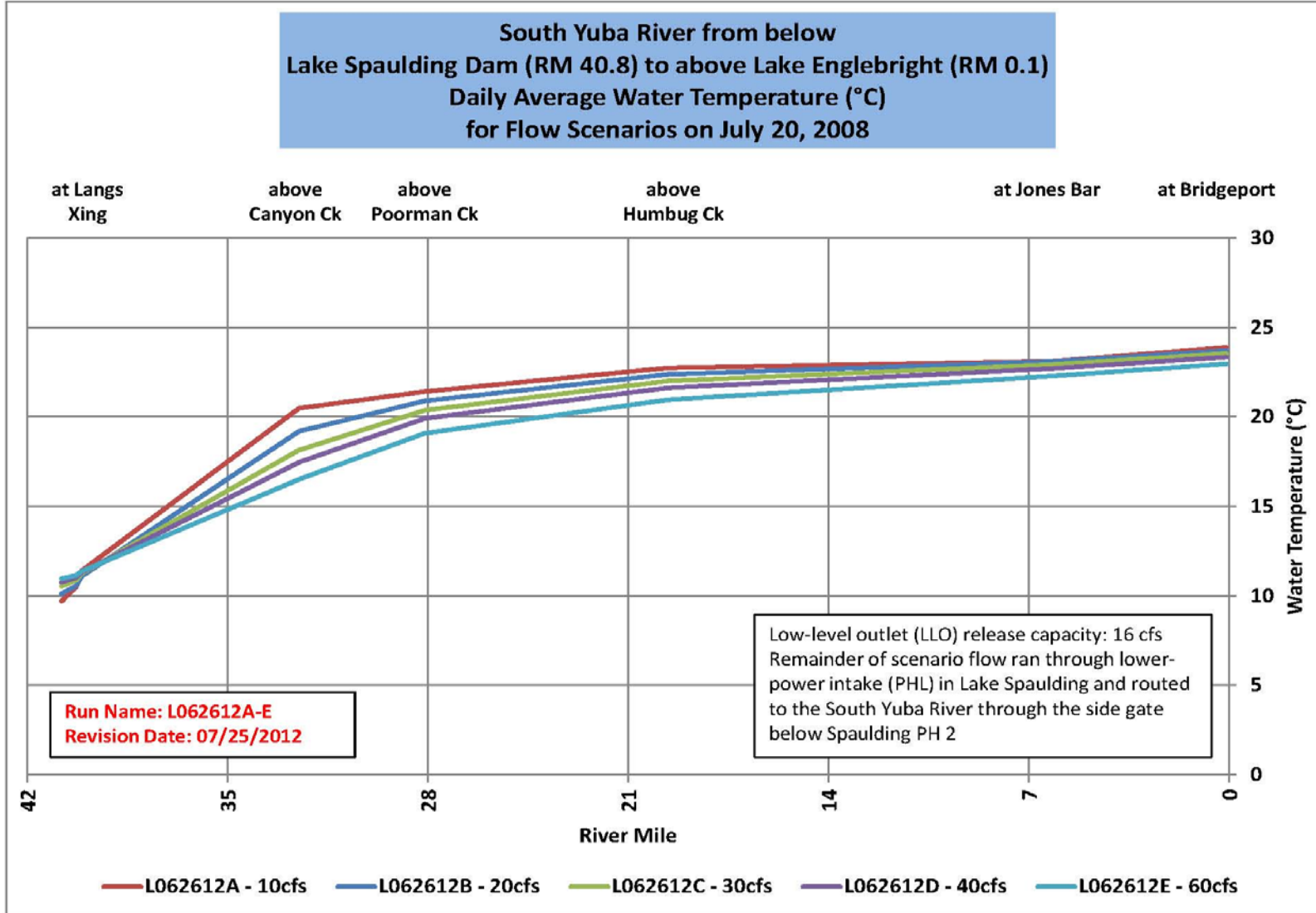


Figure 3-91. Daily average water temperature (°C) South Yuba River below Lake Spaulding dam (RM 40.8) to above Lake Englebright (RM 0.1) on July 20, 2009 for five Lake Spaulding dam discharge (10, 20, 30, 40, and 60 cfs) scenarios on July 20, 2008. (Source: Supplement 4 to Amended License Application; PG&E, August 30, 2012)

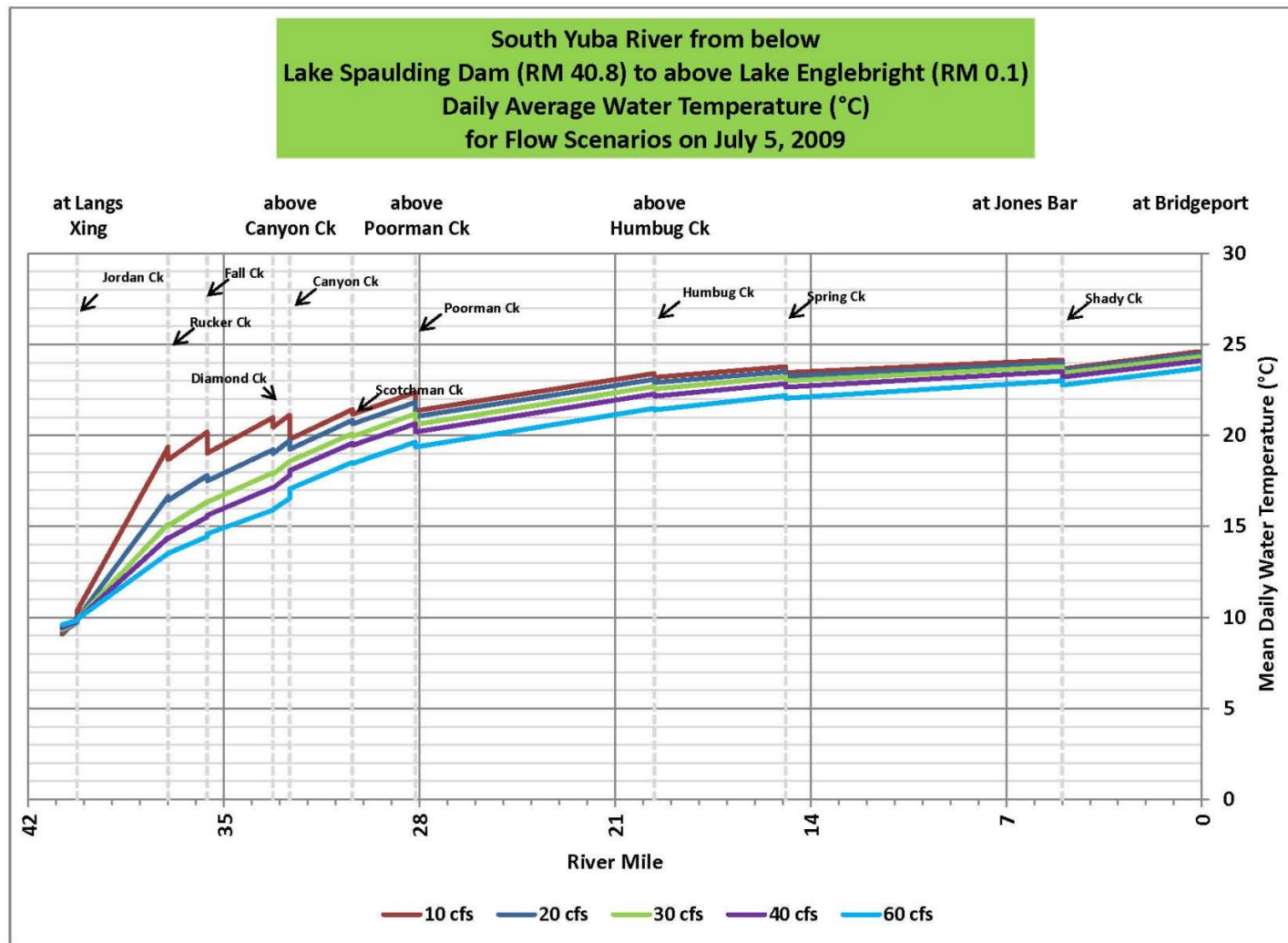


Figure 3-92. Daily average water temperature (°C) South Yuba River below Lake Spaulding dam (RM 40.8) to above Lake Englebright (RM 0.1) on July 20, 2009 for five Lake Spaulding dam discharge (10, 20, 30, 40, and 60 cfs) scenarios on July 20, 2009. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, January 23, 2013)

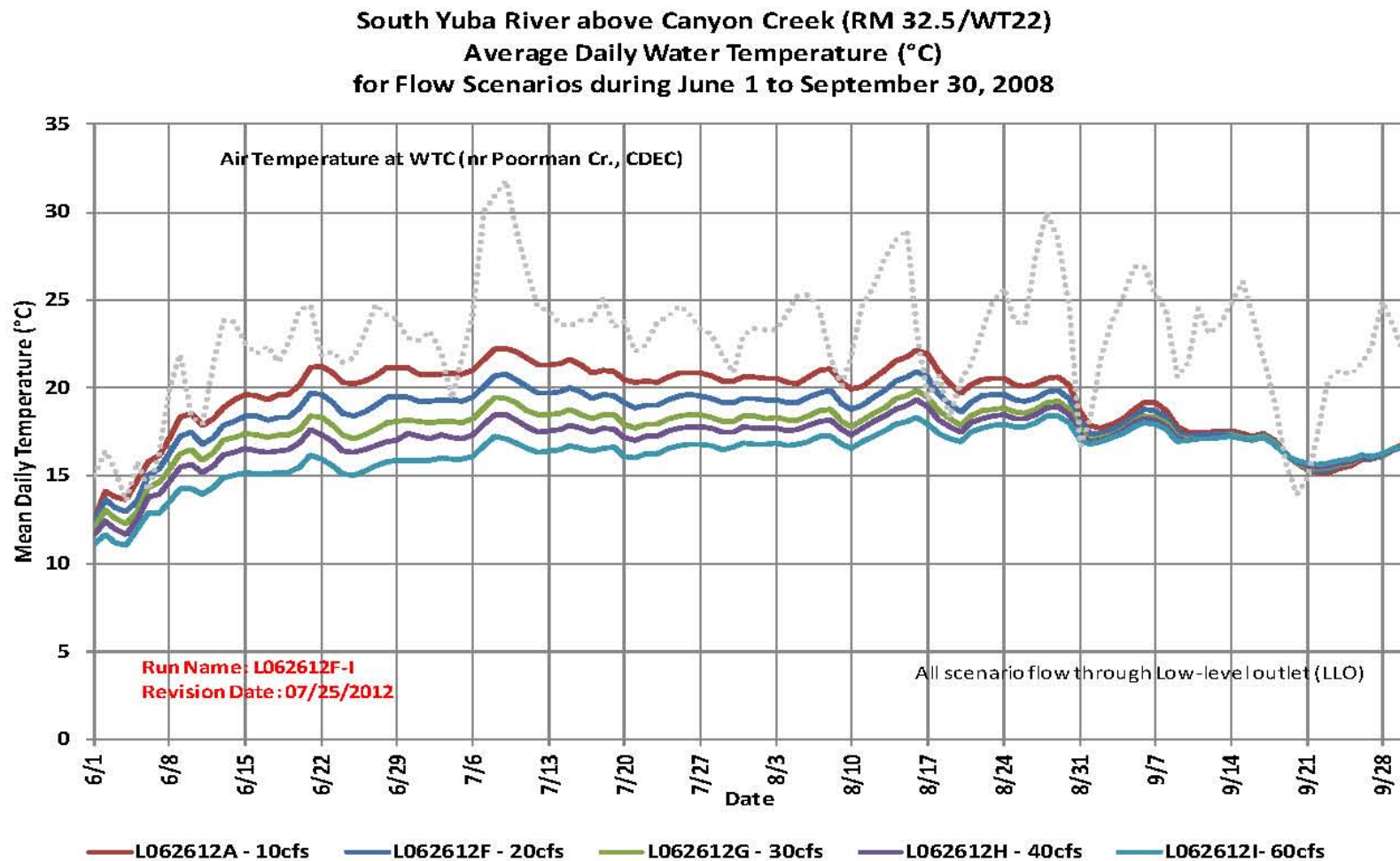


Figure 3-93. Modeled mean daily water temperatures under independent modeled-flow scenarios, June through September in South Yuba River above the confluence with Canyon Creek – 2008. (Source: *Supplement 4 to Amended License Application*; PG&E, August 30, 2012)

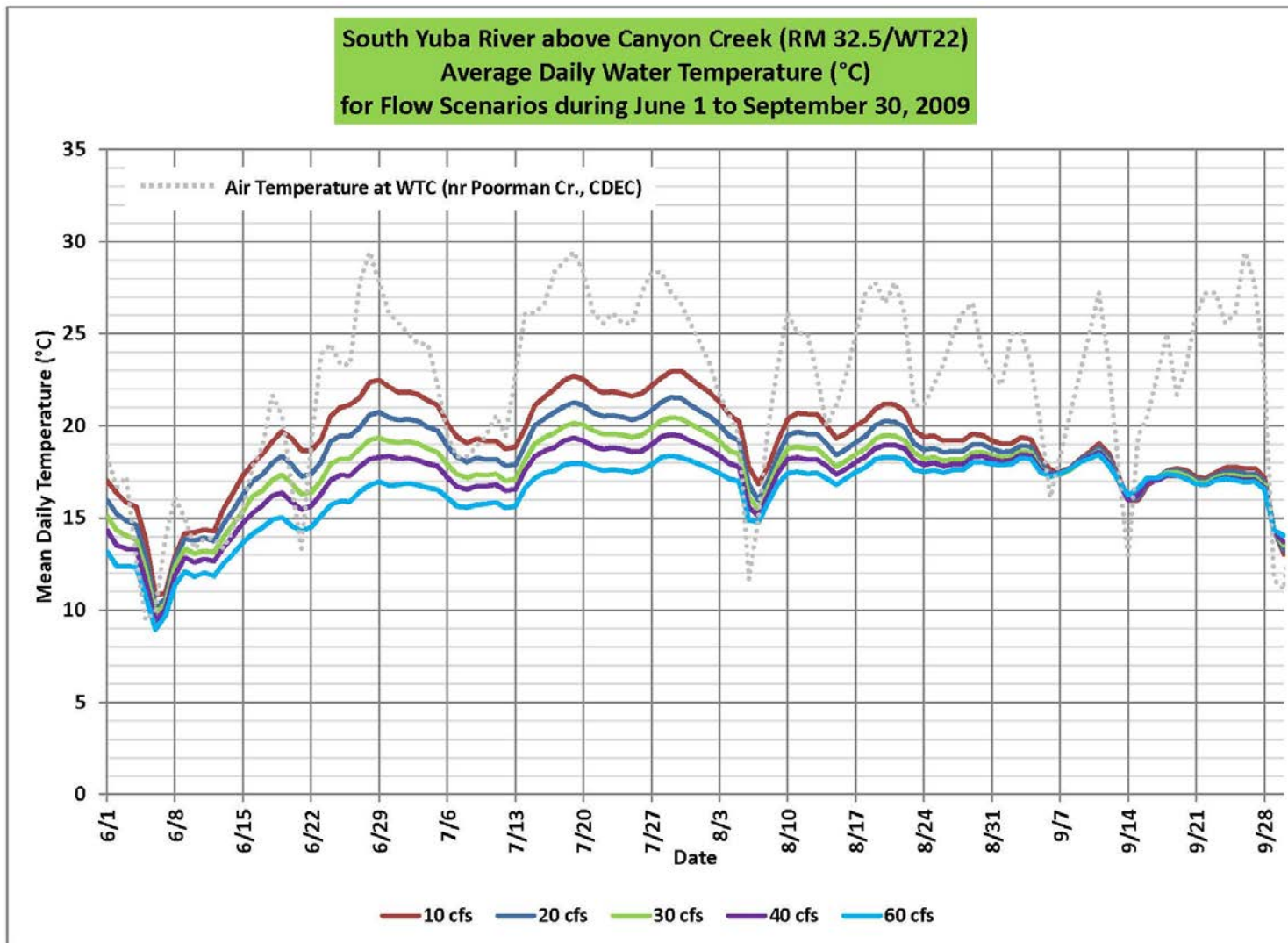


Figure 3-94. Modeled mean daily water temperatures under independent modeled-flow scenarios, June through September in South Yuba River above the confluence with Canyon Creek – 2009. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, January 23, 2013)

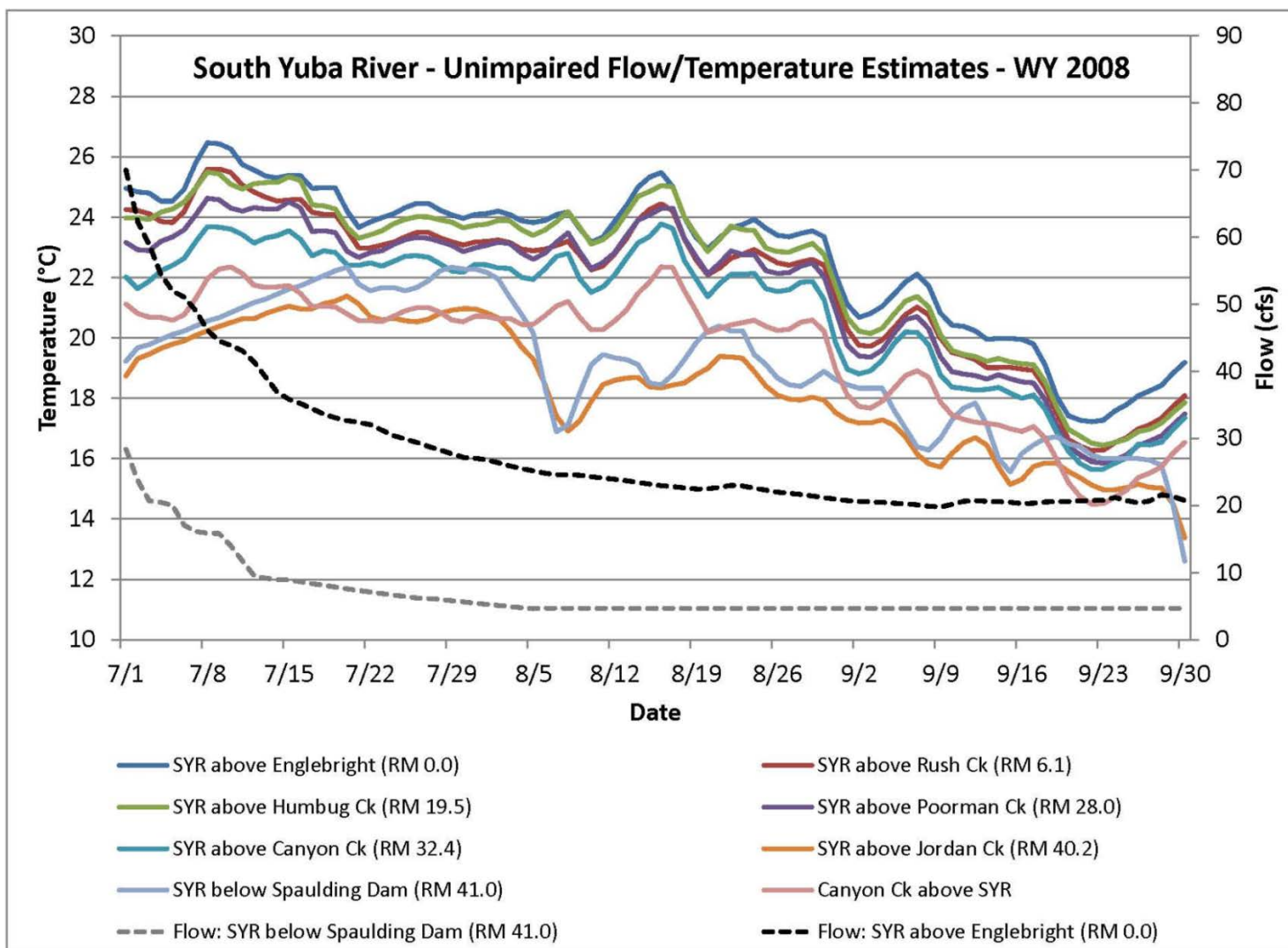


Figure 3-95. Model estimated water temperatures associated with unregulated (unimpaired) flow conditions at various locations in the South Yuba River below Lake Spaulding dam and Canyon Creek above South Yuba River between July 1 and September 30 2008. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results NID*, January 23, 2013)

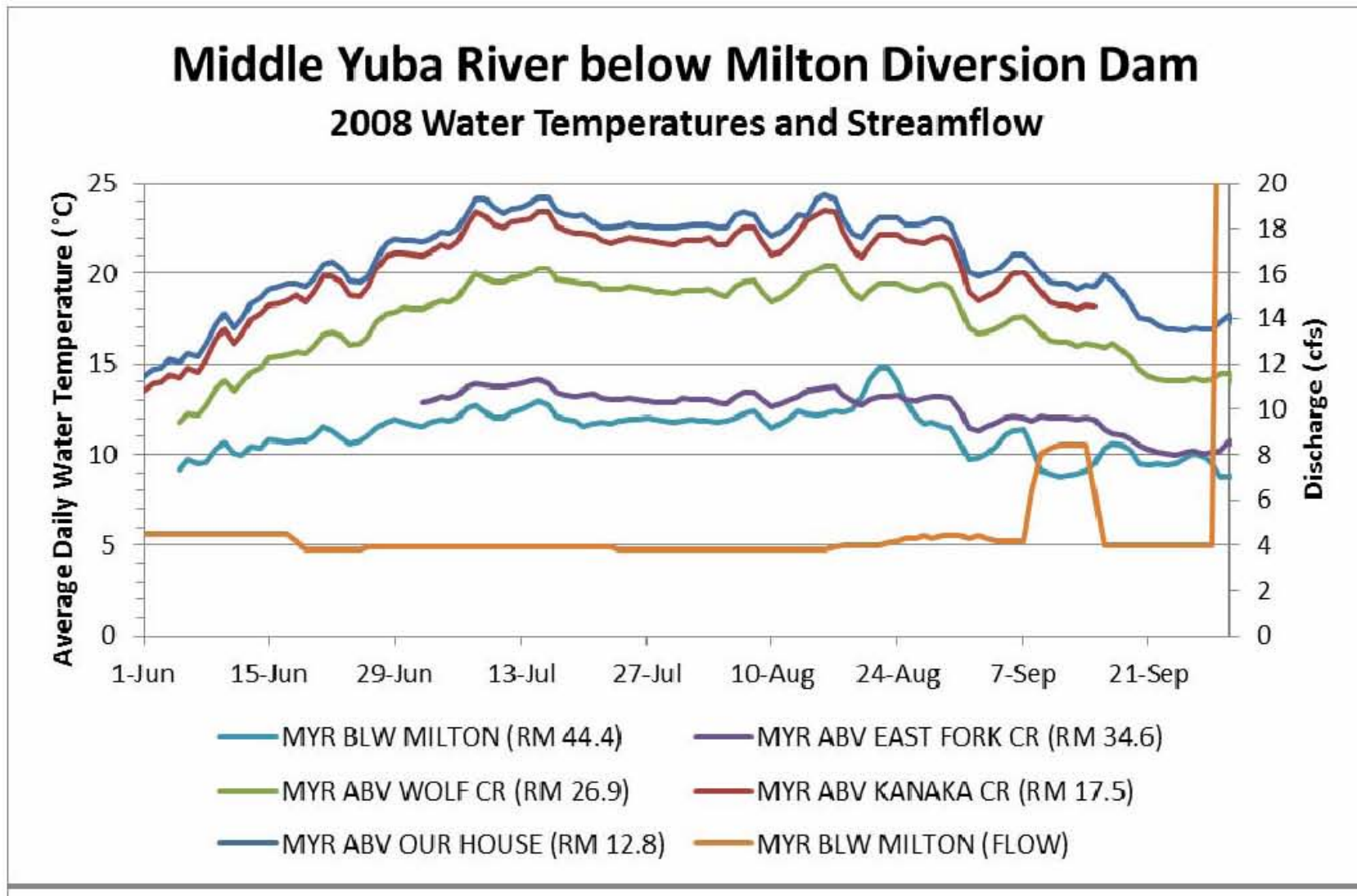


Figure 3-96. Daily average water temperature under existing license flows in the Middle Yuba River below Milton diversion dam to above Our House (non-project) reservoir based on 2008 water temperature monitoring program. (Source: California Fish and Wildlife, July 30, 2012)

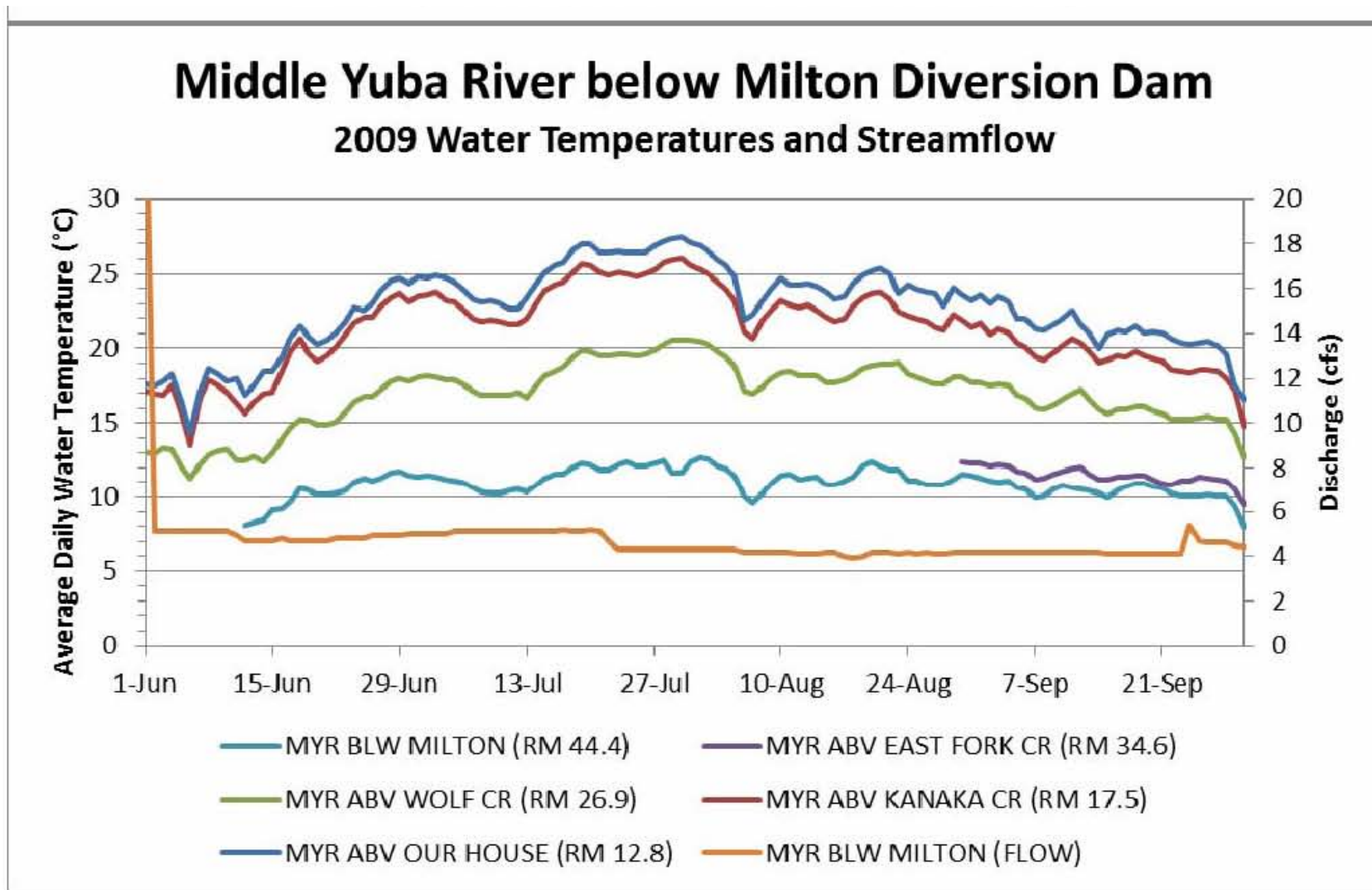


Figure 3-97. Daily average water temperature under existing license flows in the Middle Yuba River below Milton diversion dam to above Our House (non-project) reservoir based on 2009 water temperature monitoring program. (Source: California Fish and Wildlife, July 30, 2012)

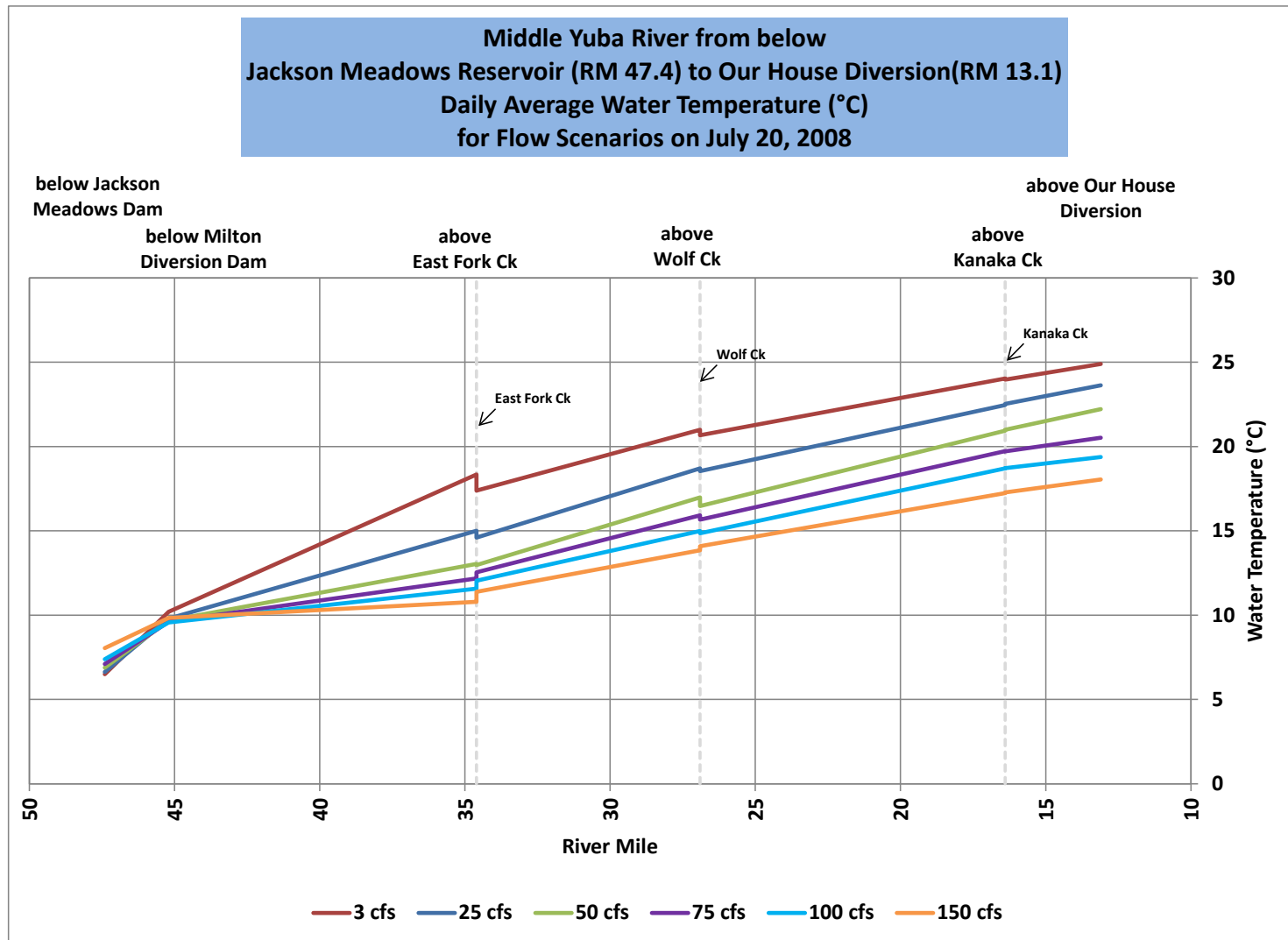


Figure 3-98. Daily Average Water Temperature (°C) for Middle Yuba River below Milton diversion dam (RM 44.4) to above Our House reservoir (RM 12.8) for Incremental Flow Scenarios on July 20 2008. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, February 14, 2013)

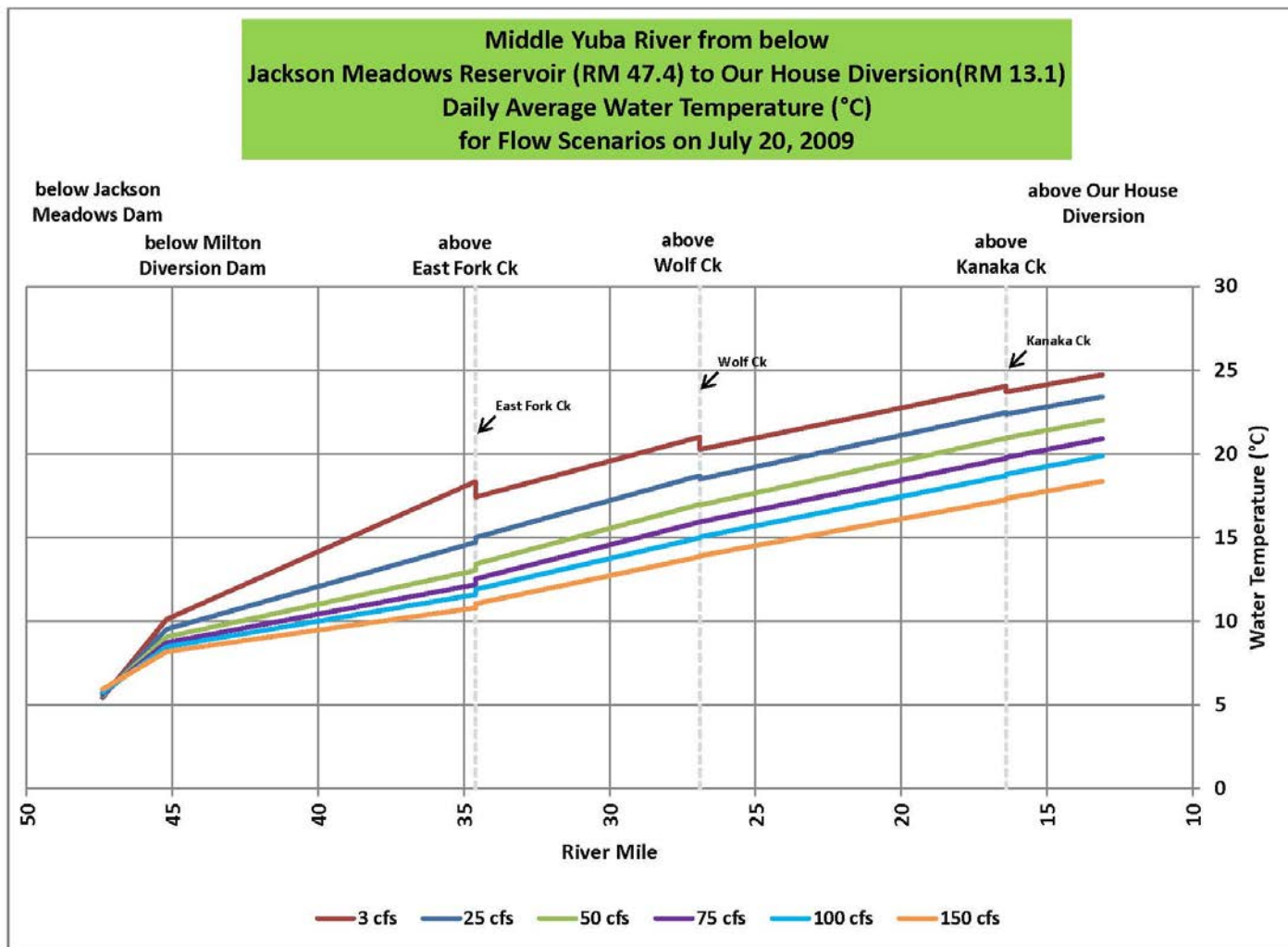


Figure 3-99. Daily Average Water Temperature (°C) for Middle Yuba River below Milton diversion dam (RM 44.4) to above Our House diversion impoundment (RM 12.8) for Incremental Flow Scenarios on July 20, 2008. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, January 23, 2013)

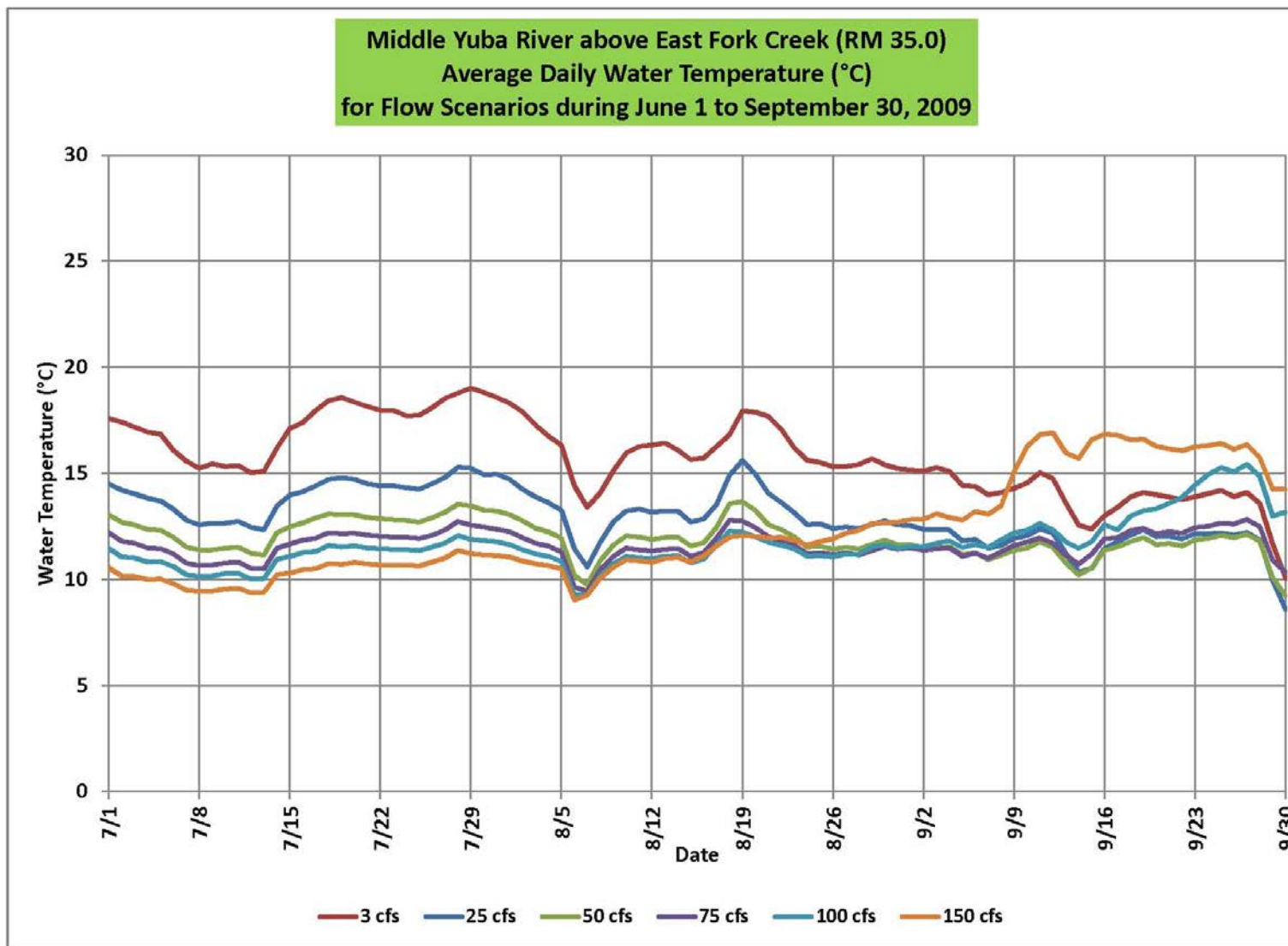


Figure 3-100. Model-estimated Water temperature in Middle Yuba River below Milton diversion dam and above East Fork Creek (RM 35) at incremental discharge flows from the Milton Diversion dam. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, January 23, 2013)

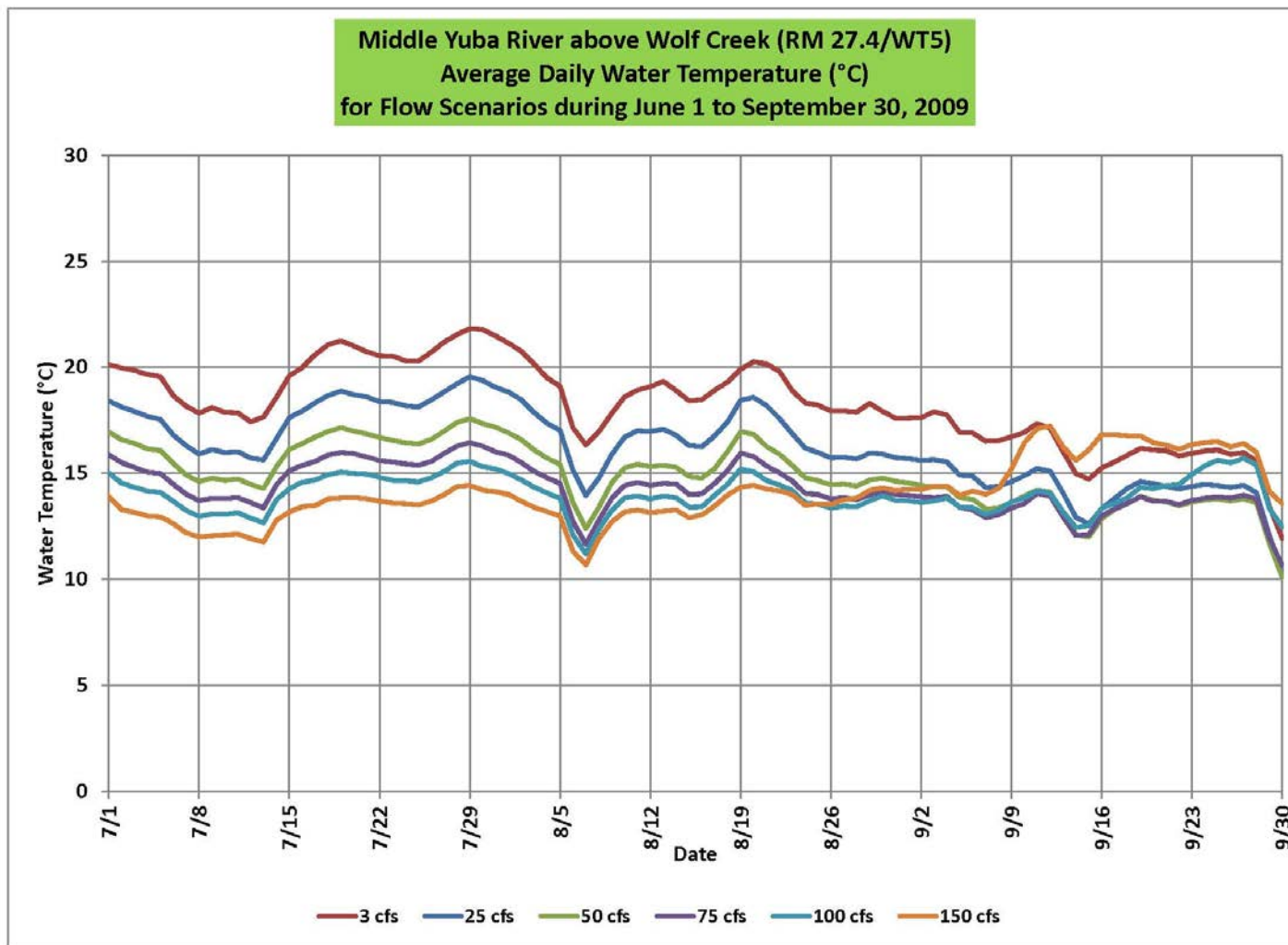


Figure 3-101. Model-estimated Water temperature in Middle Yuba River below Milton diversion dam and above Wolf Creek (RM 27.4) at incremental discharge flows from the Milton Diversion dam. (Source: *Additional Information Regarding Water Temperature and Operations Modeling Results* NID, January 23, 2013)

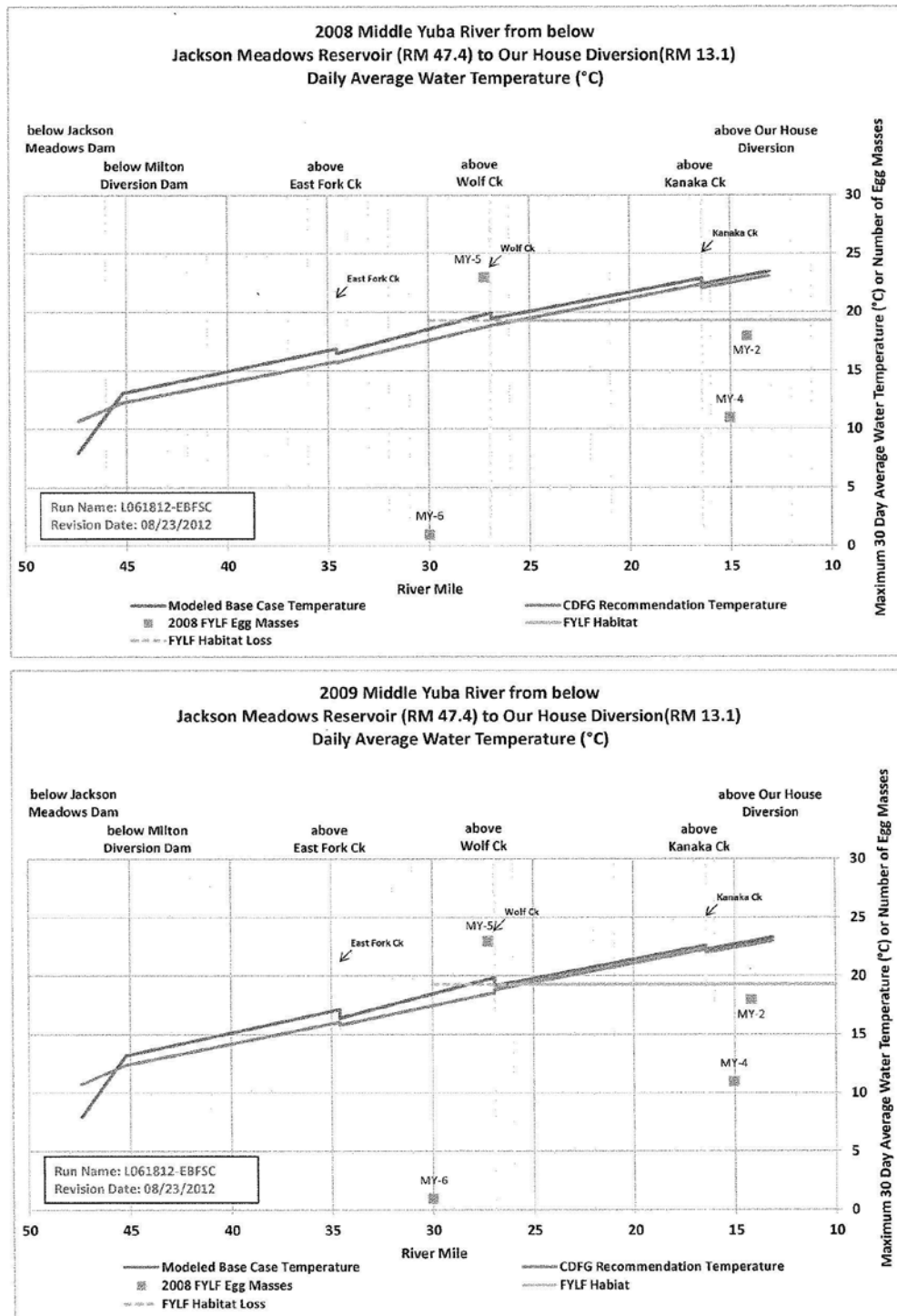


Figure 3-102. Middle Yuba River below Milton diversion dam Maximum 30-day Average Water Temperature between Jackson Meadows Lake dam and Our House reservoir and estimated foothill yellow-legged frog habitat loss for existing license conditions and California Fish and Wildlife Block Flow proposal estimated for meteorological conditions in 2008 (top) and 2009 (bottom). (Source: PCWA, September 14, 2012)

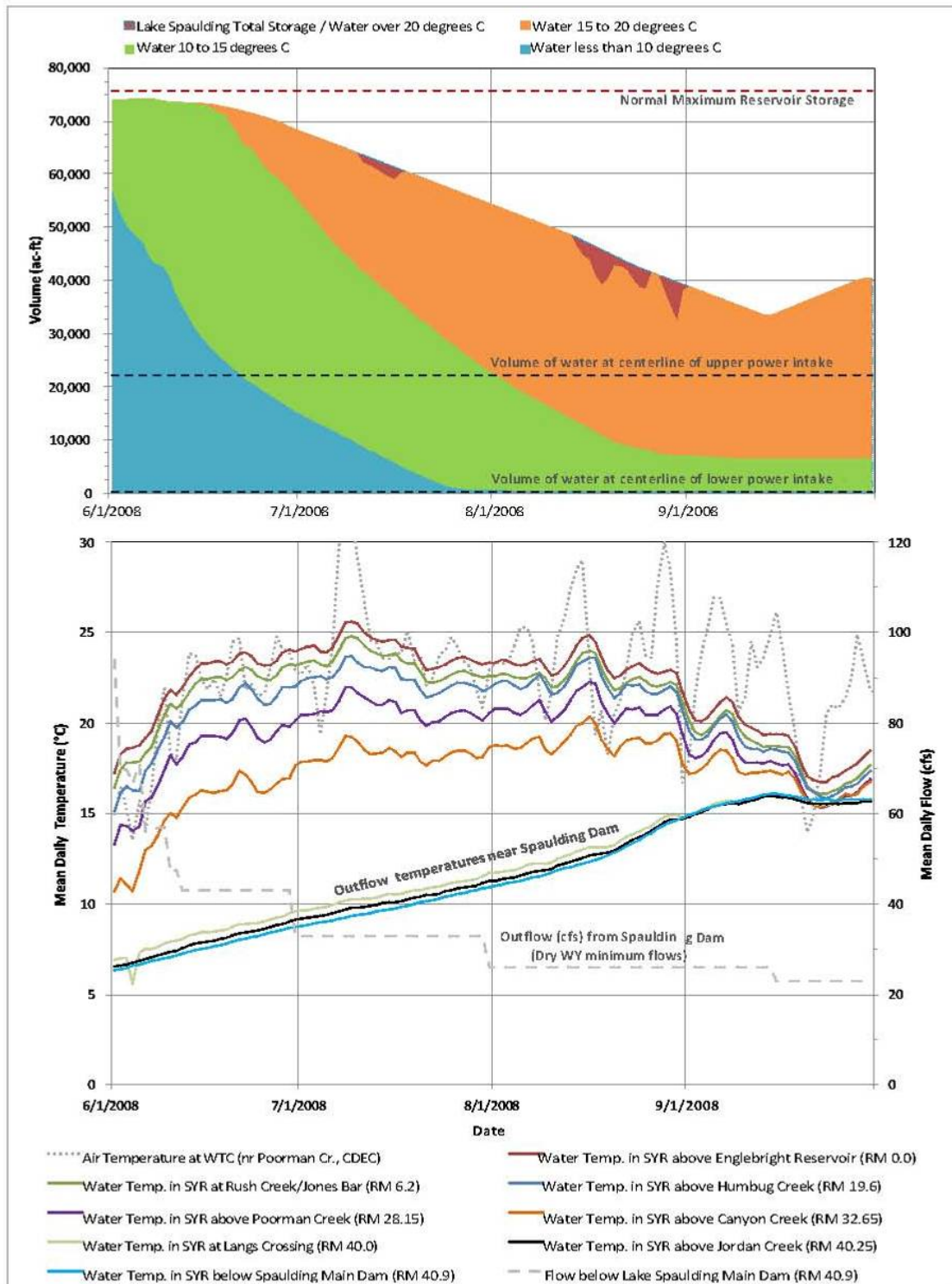


Figure 3-103. Modeled Lake Spaulding water temperature and mean daily water temperatures from June through September in South Yuba River from Lake Spaulding dam to Englebright reservoir – 2008. (Source: Supplement No. 4 to Amended License Application; PG&E, August 2012)

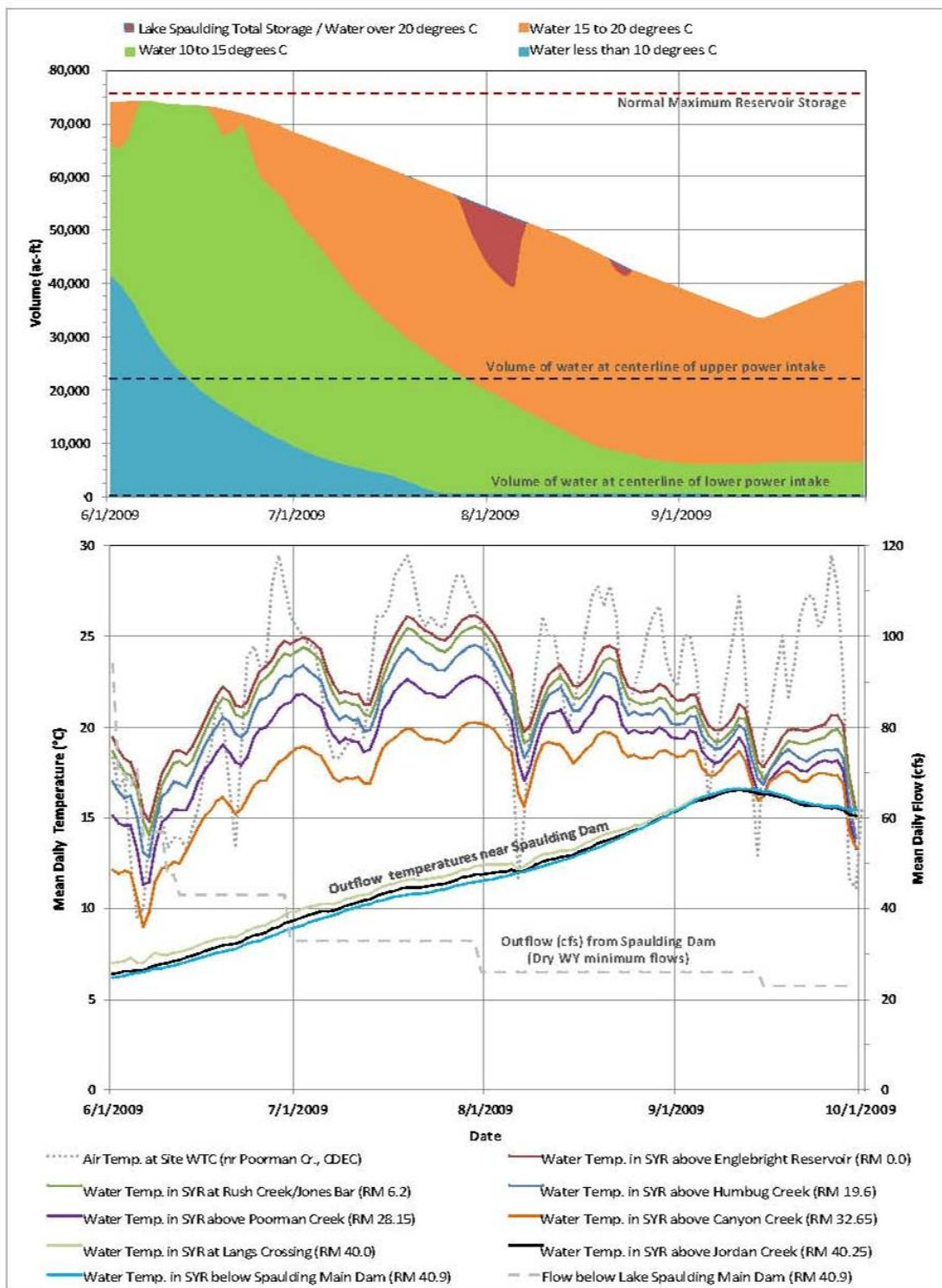


Figure 3-104. Modeled Lake Spaulding water temperature and mean daily water temperatures from June through September in South Yuba River from Lake Spaulding dam to Englebright reservoir – 2009. (Source: Supplement No. 4 to Amended License Application; PG&E, August 2012)

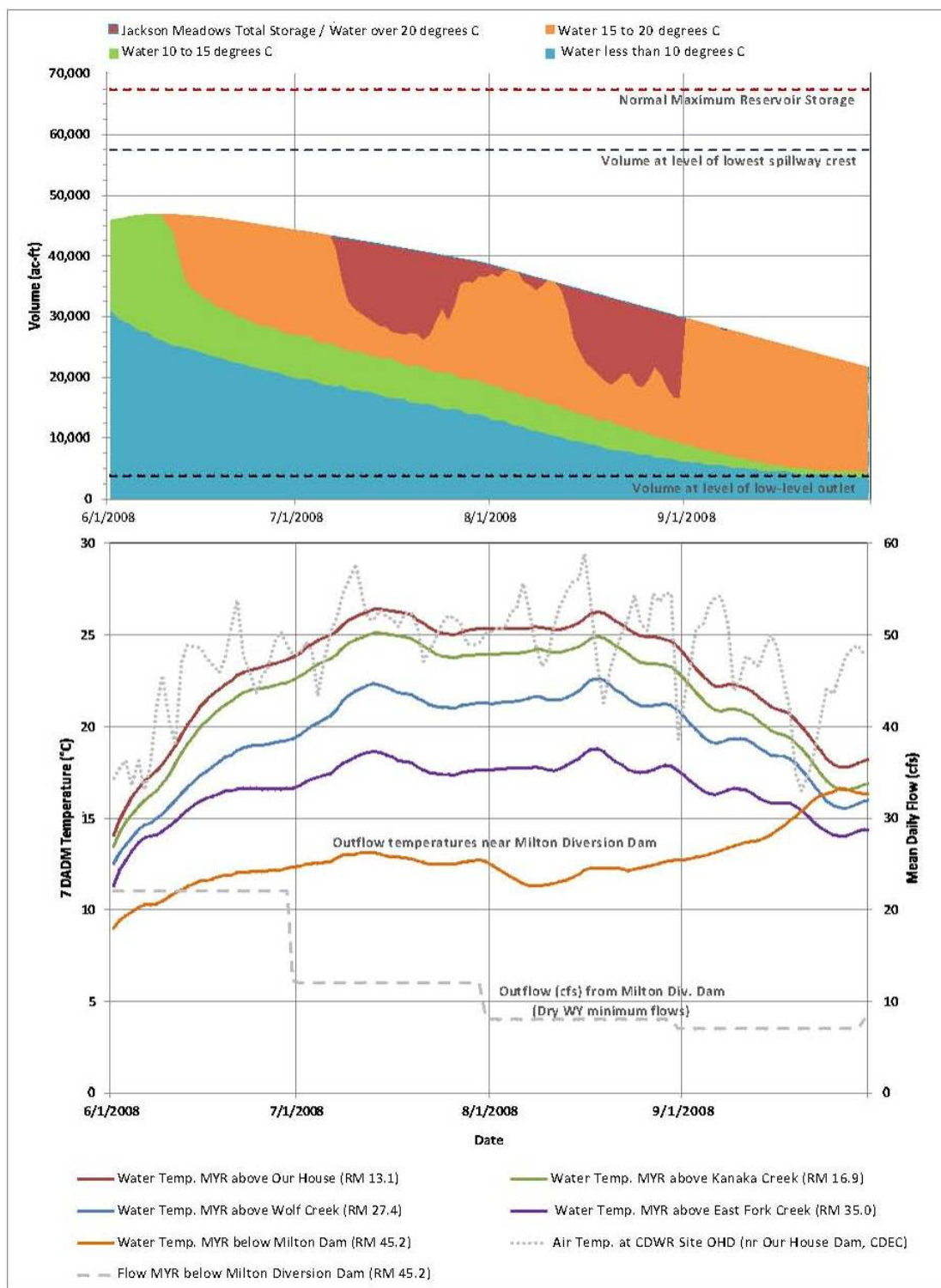


Figure 3-105. Modeled Jackson Meadows water temperature and 7DADM water temperatures from June through September in the Middle Yuba River from Milton diversion dam to Our House diversion dam – 2008. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

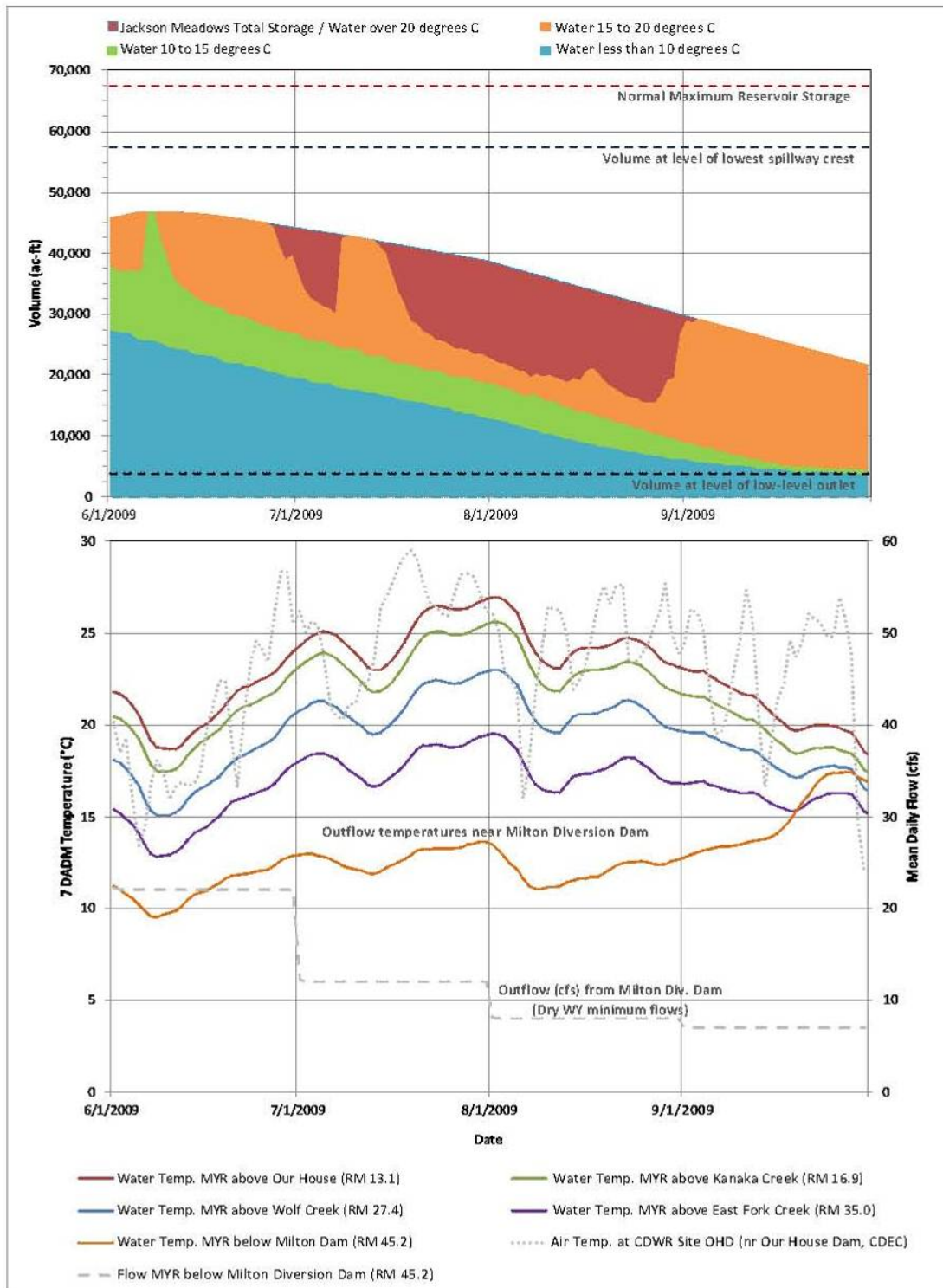


Figure 3-106. Modeled Jackson Meadows water temperature and 7DADM water temperatures from June through September in the Middle Yuba River from Milton diversion dam to Our House diversion dam – 2009. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

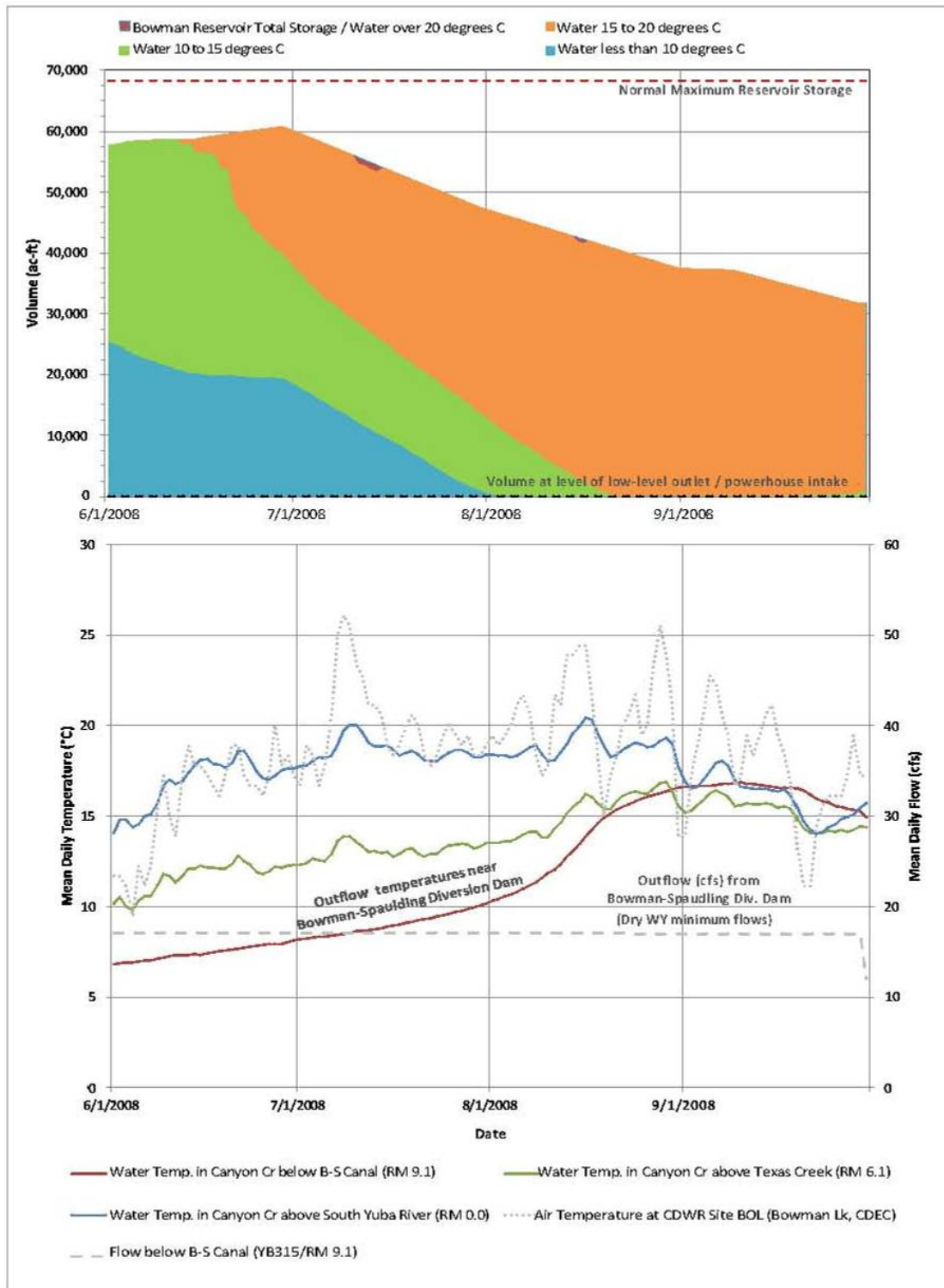


Figure 3-107. Modeled Bowman reservoir water temperature and mean daily water temperature from June through September in Canyon Creek from Bowman-Spaulling diversion dam to the South Yuba River – 2008. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

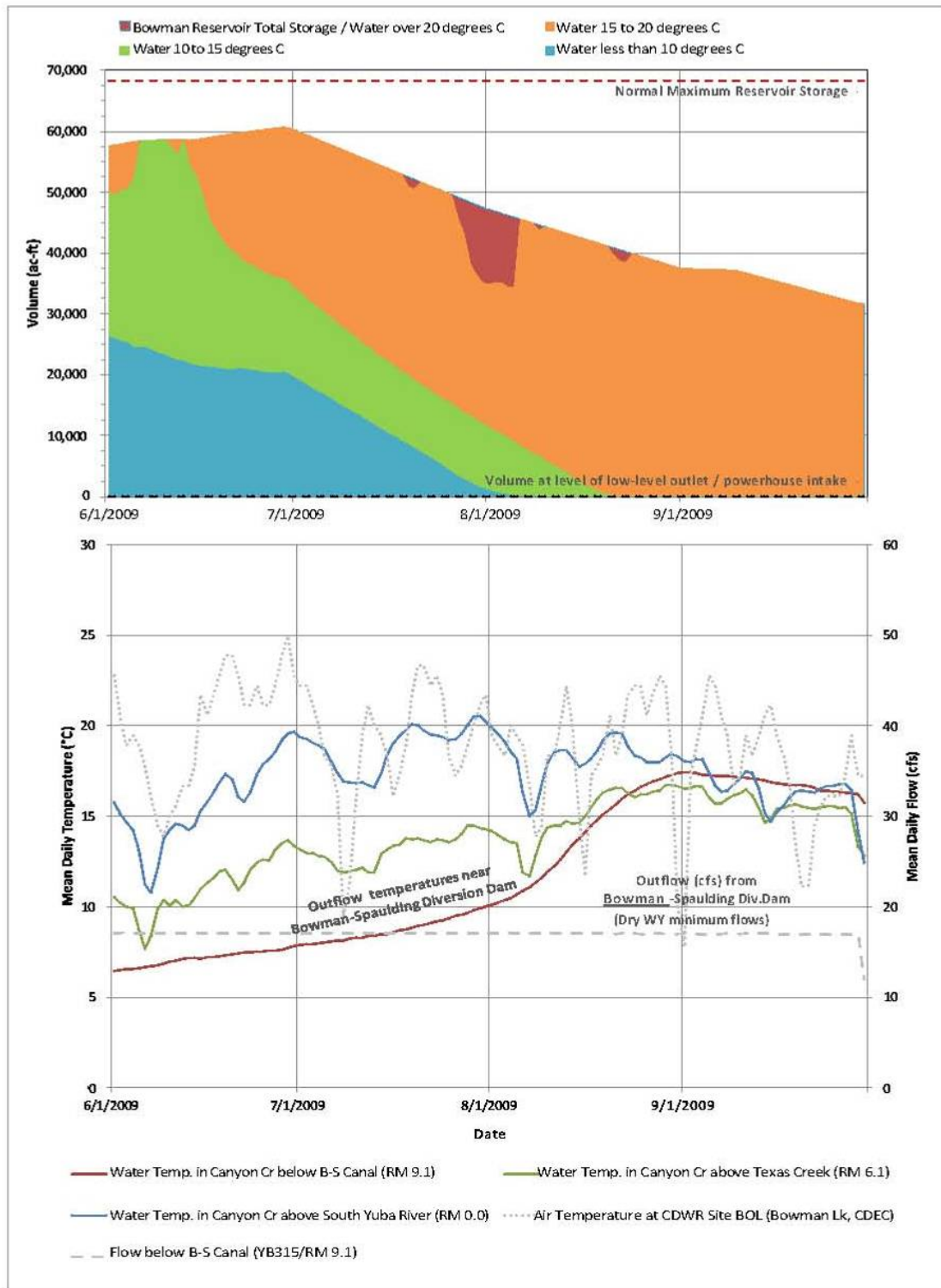


Figure 3-108. Modeled Bowman reservoir water temperature and daily water temperatures from June through September in Canyon Creek from Bowman-Spaulding diversion dam to the South Yuba River – 2009. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

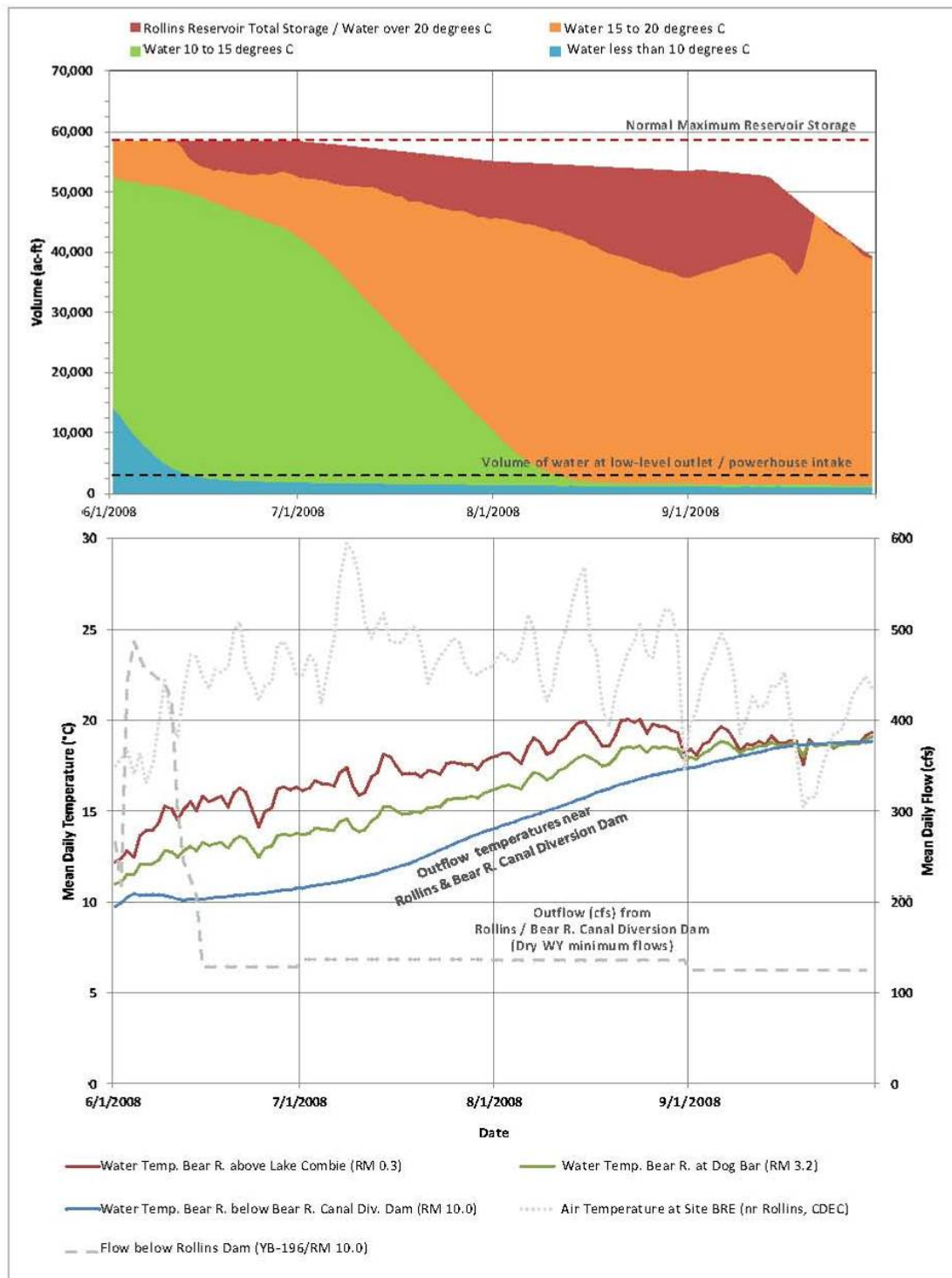


Figure 3-109. Modeled Rollins reservoir water temperature and mean daily water temperatures from June through September in the Bear River from Rollins dam to Lake Combie – 2008. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

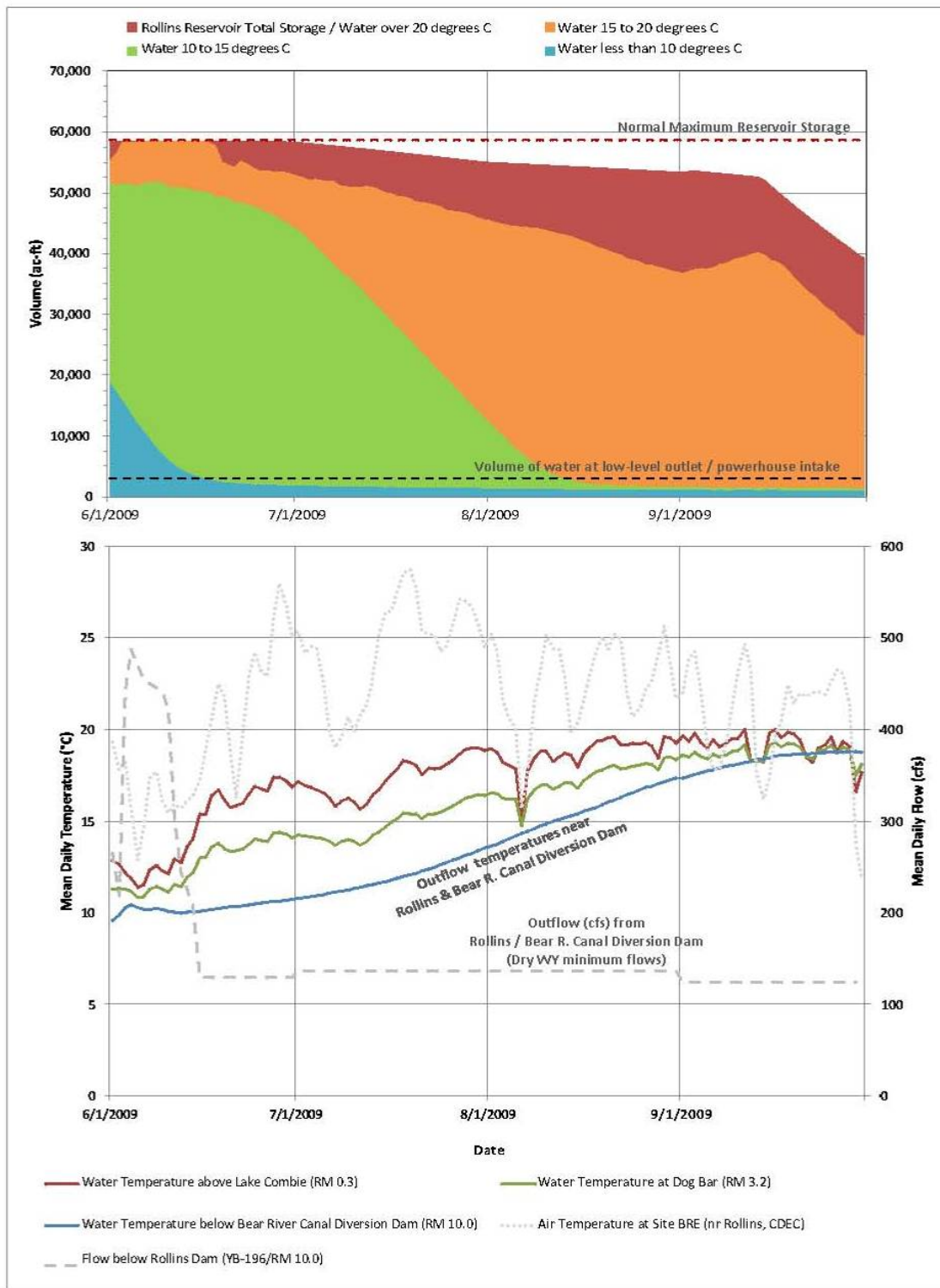


Figure 3-110. Modeled Rollins reservoir water temperature and mean daily water temperatures from June through September in the Bear River from Rollins dam to Lake Combie – 2009. (Source: Supplement No. 3 to Amended License Application; NID, August 2012)

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Appendix C

Existing and Proposed Recreation Facilities for Drum-Spaulding Project and Yuba-Bear Projects

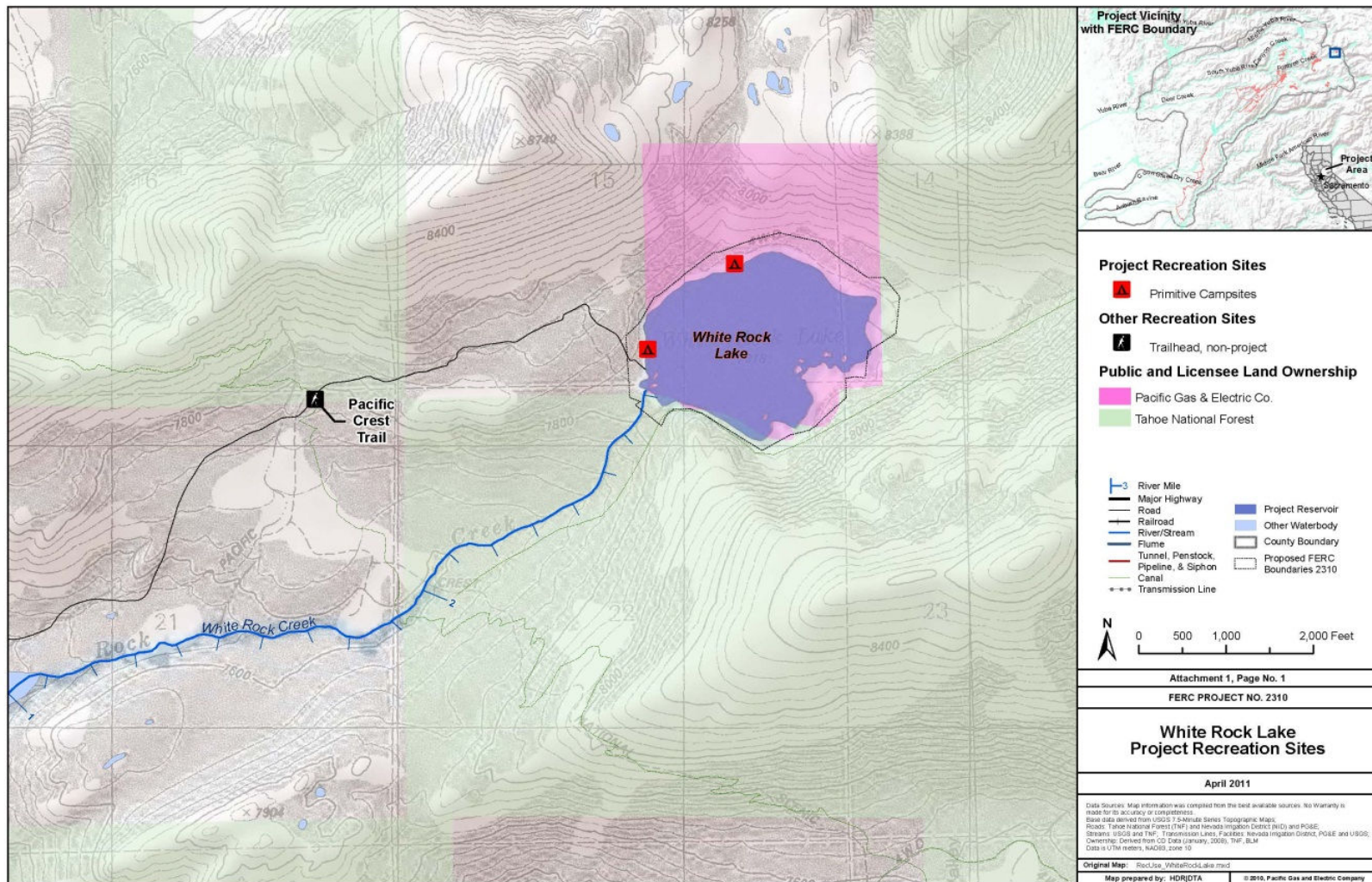


Figure C-1. Existing and proposed recreation facilities at White Rock Lake Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

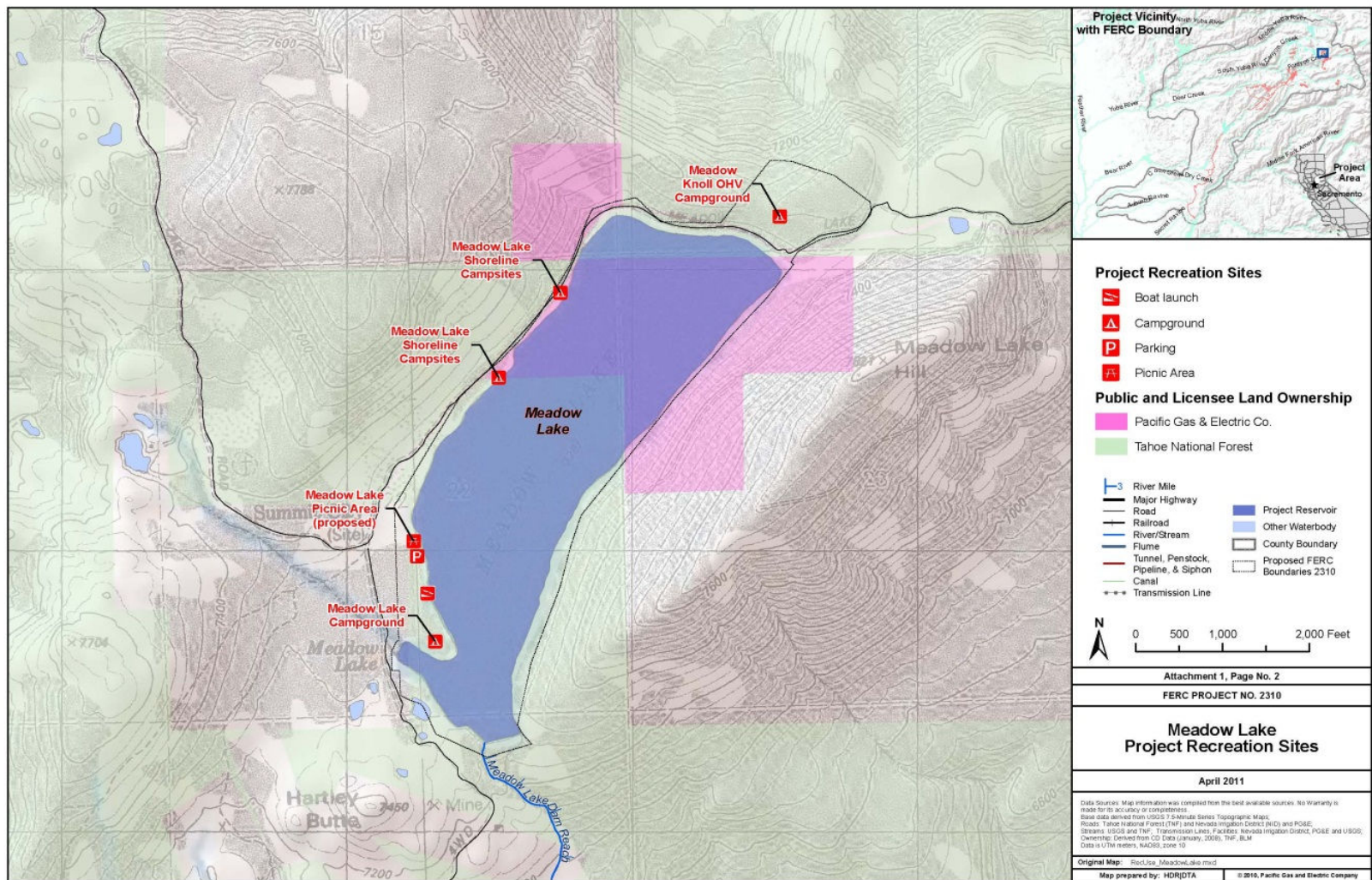


Figure C-2. Existing and proposed recreation facilities at Fordyce Lake Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

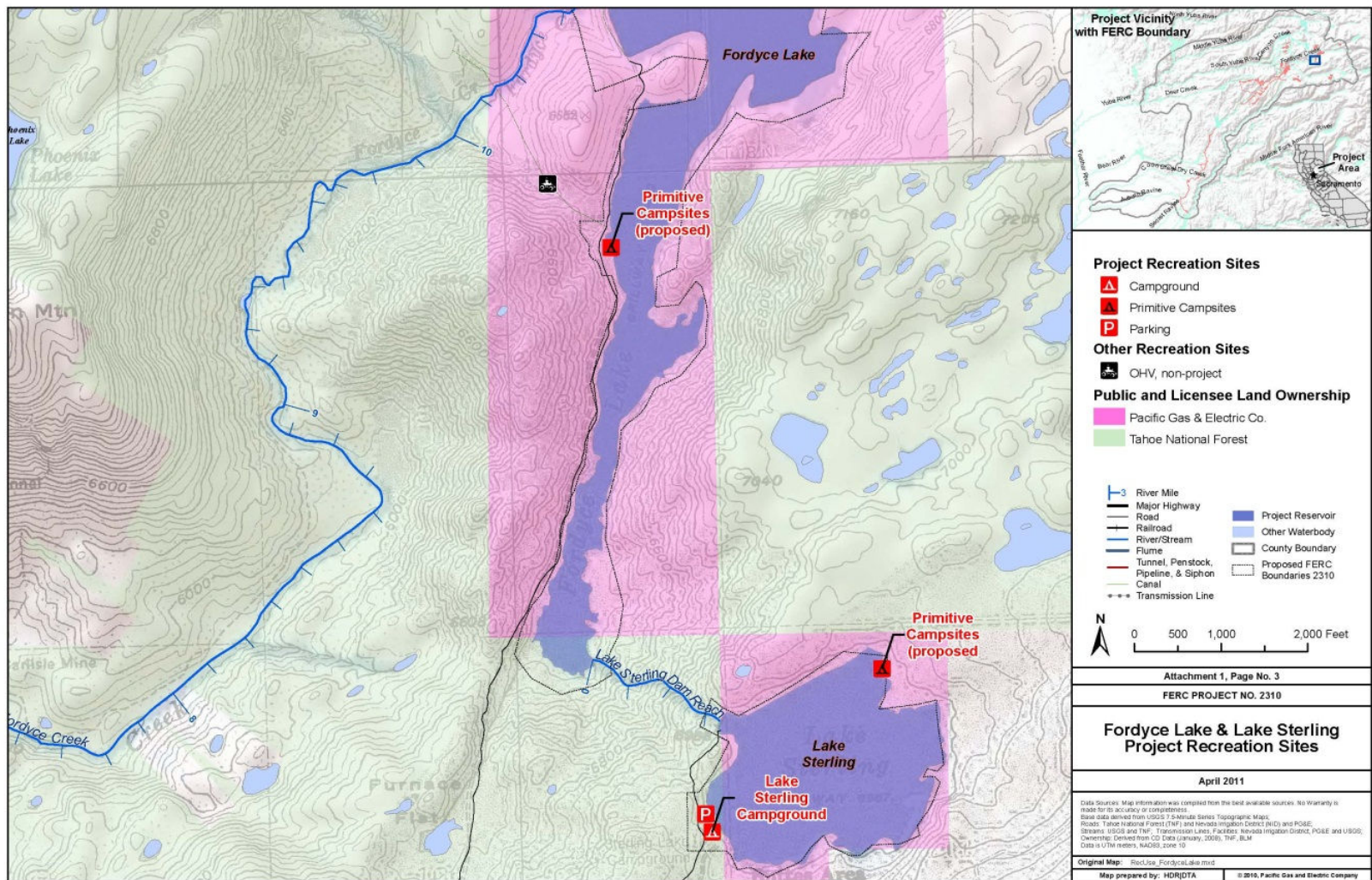


Figure C-3. Existing and proposed recreation facilities at Fordyce Lake Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

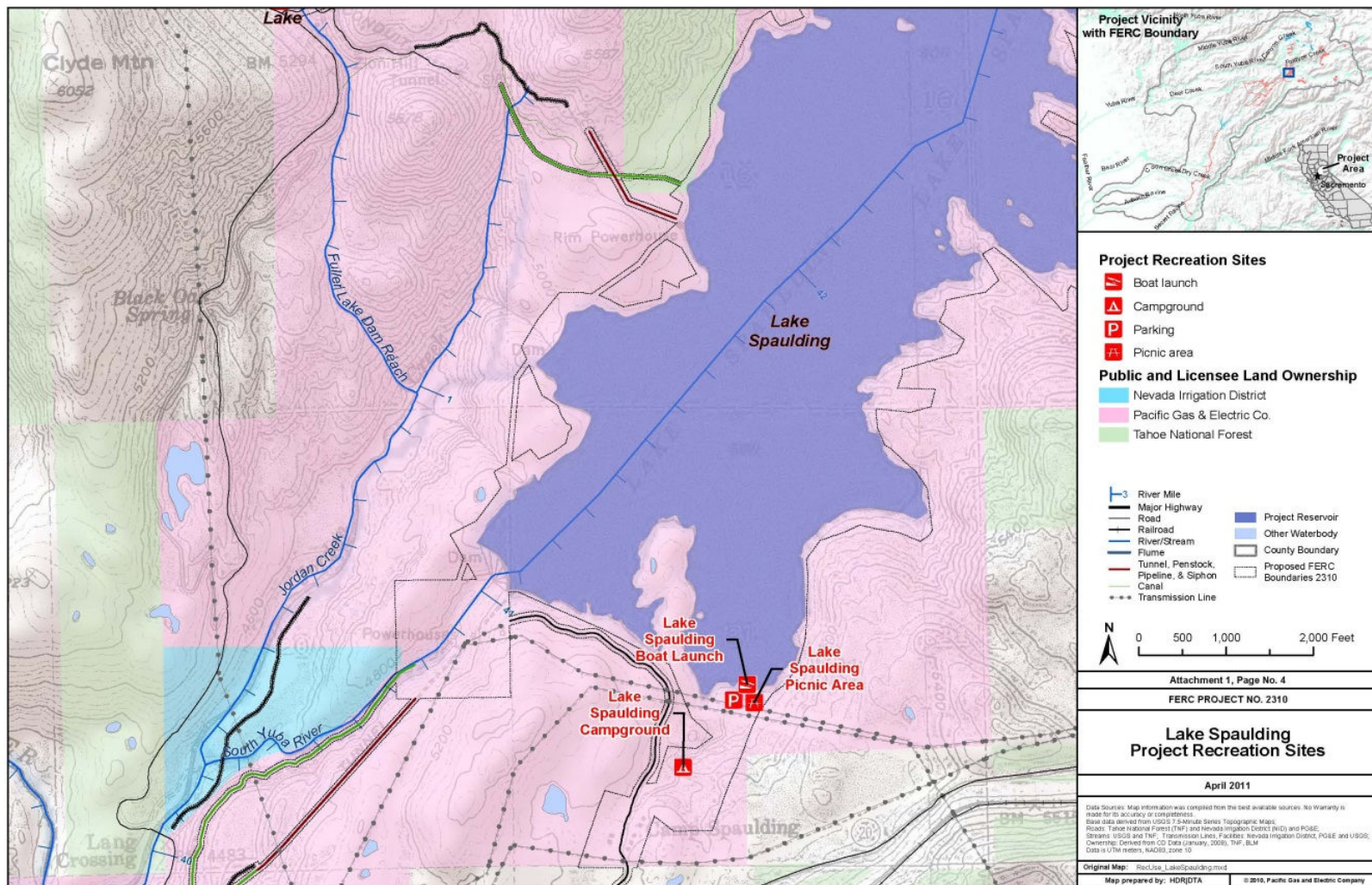


Figure C-4. Existing and proposed recreation facilities at Lake Spaulding Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

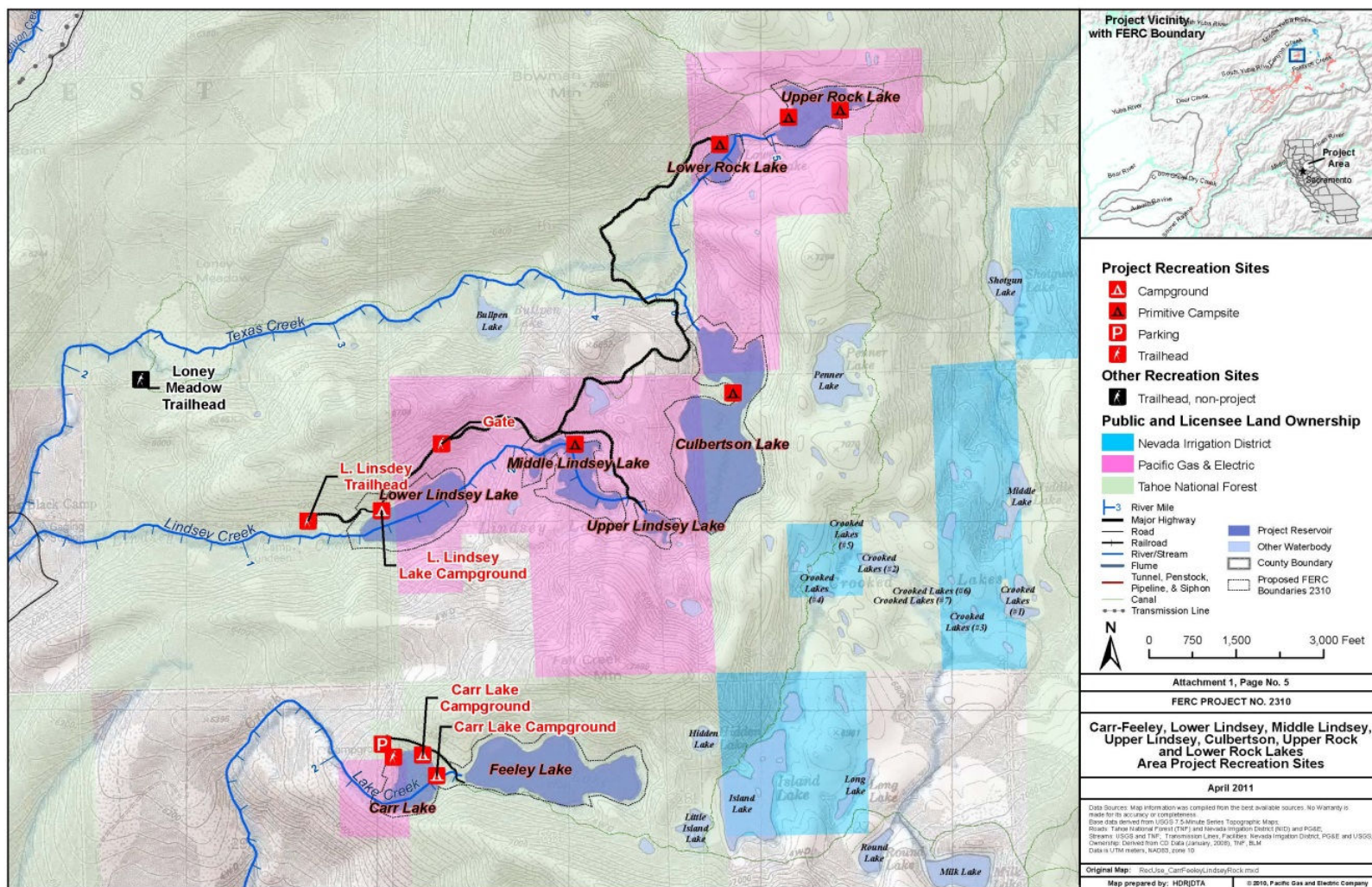


Figure C-5. Existing and proposed recreation facilities at Grouse Lakes Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

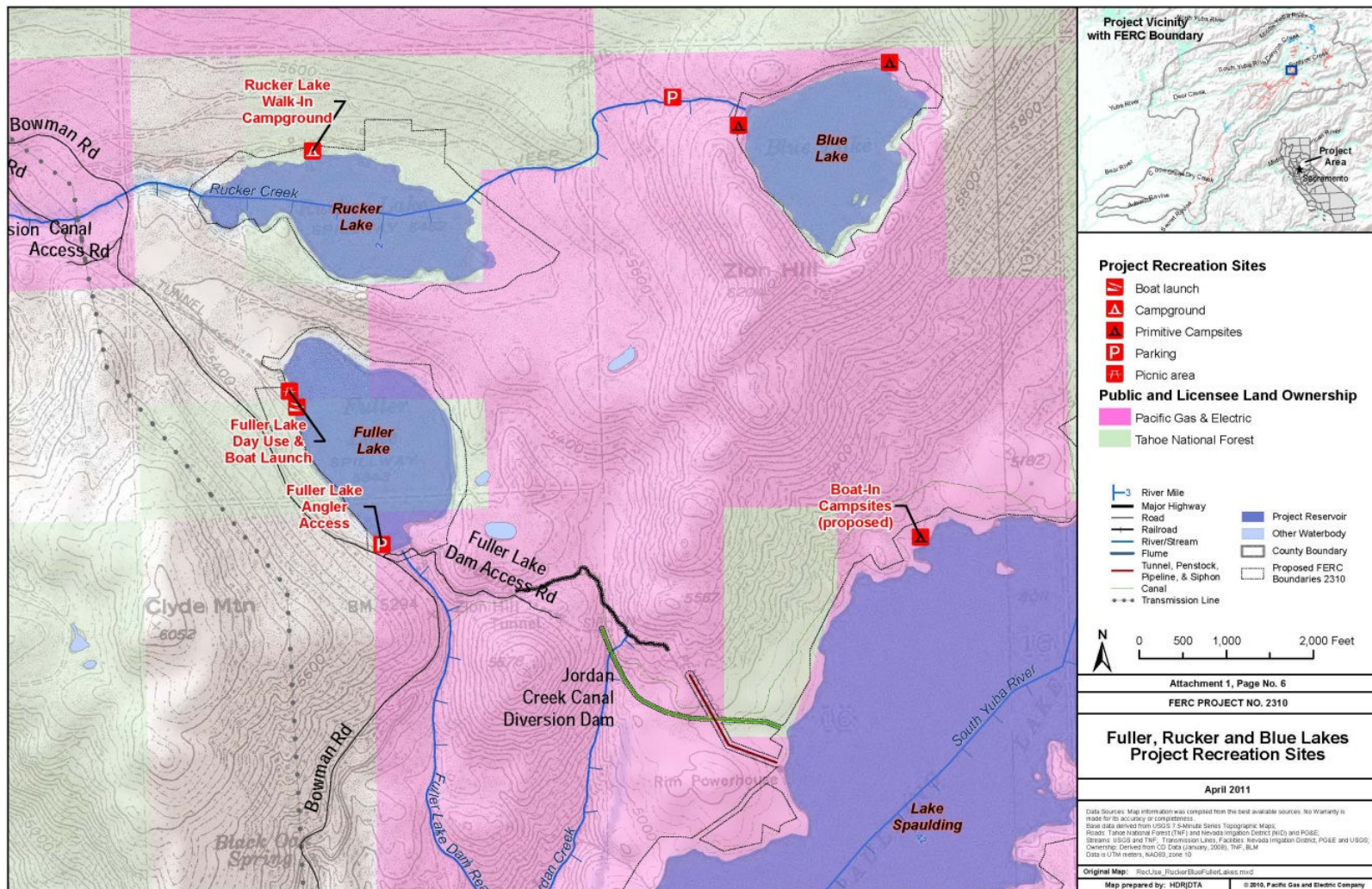


Figure C-6. Existing and proposed recreation facilities at Lake Spaulding Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

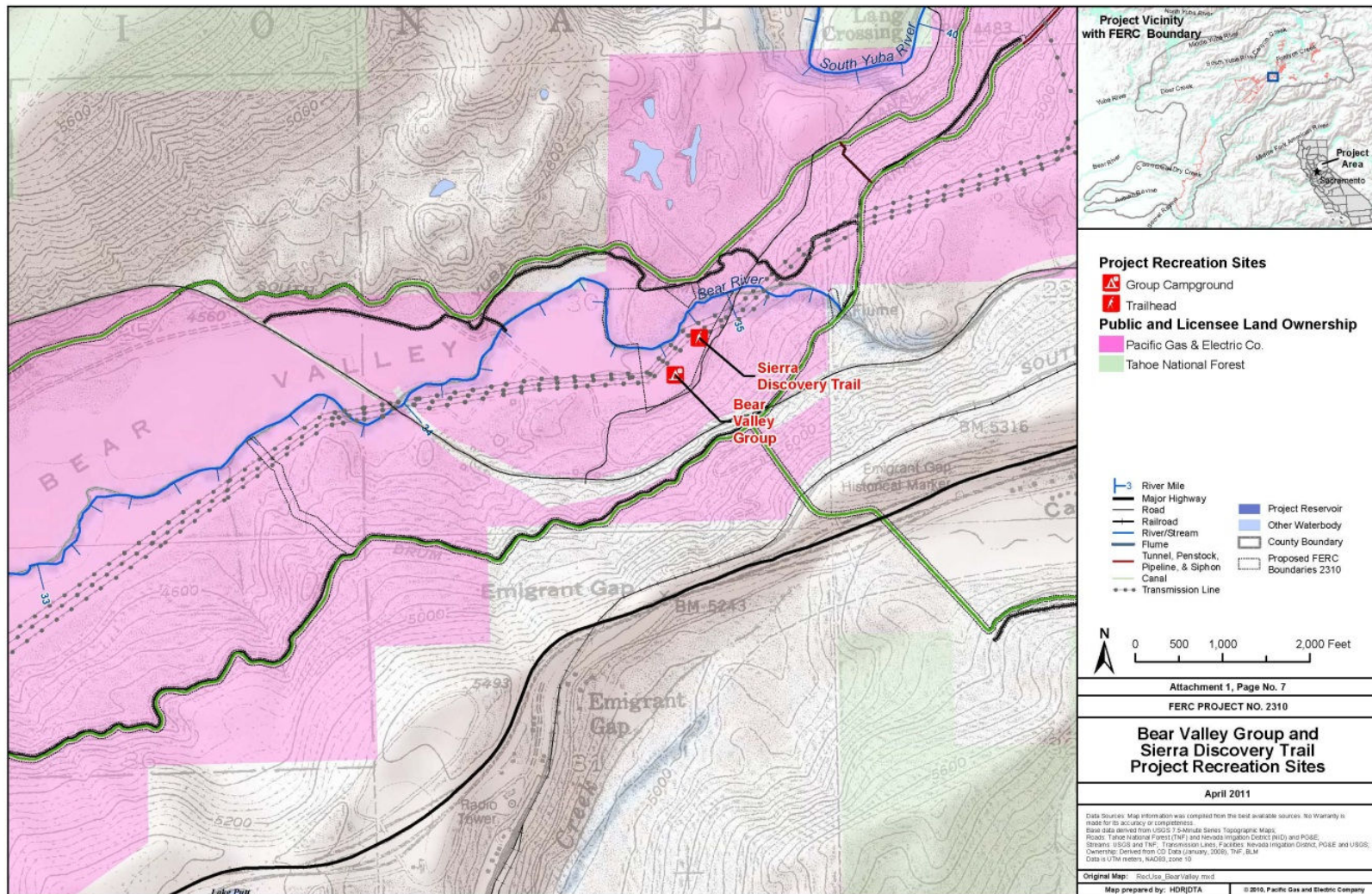


Figure C-7. Existing and proposed recreation facilities at Lake Spaulding Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

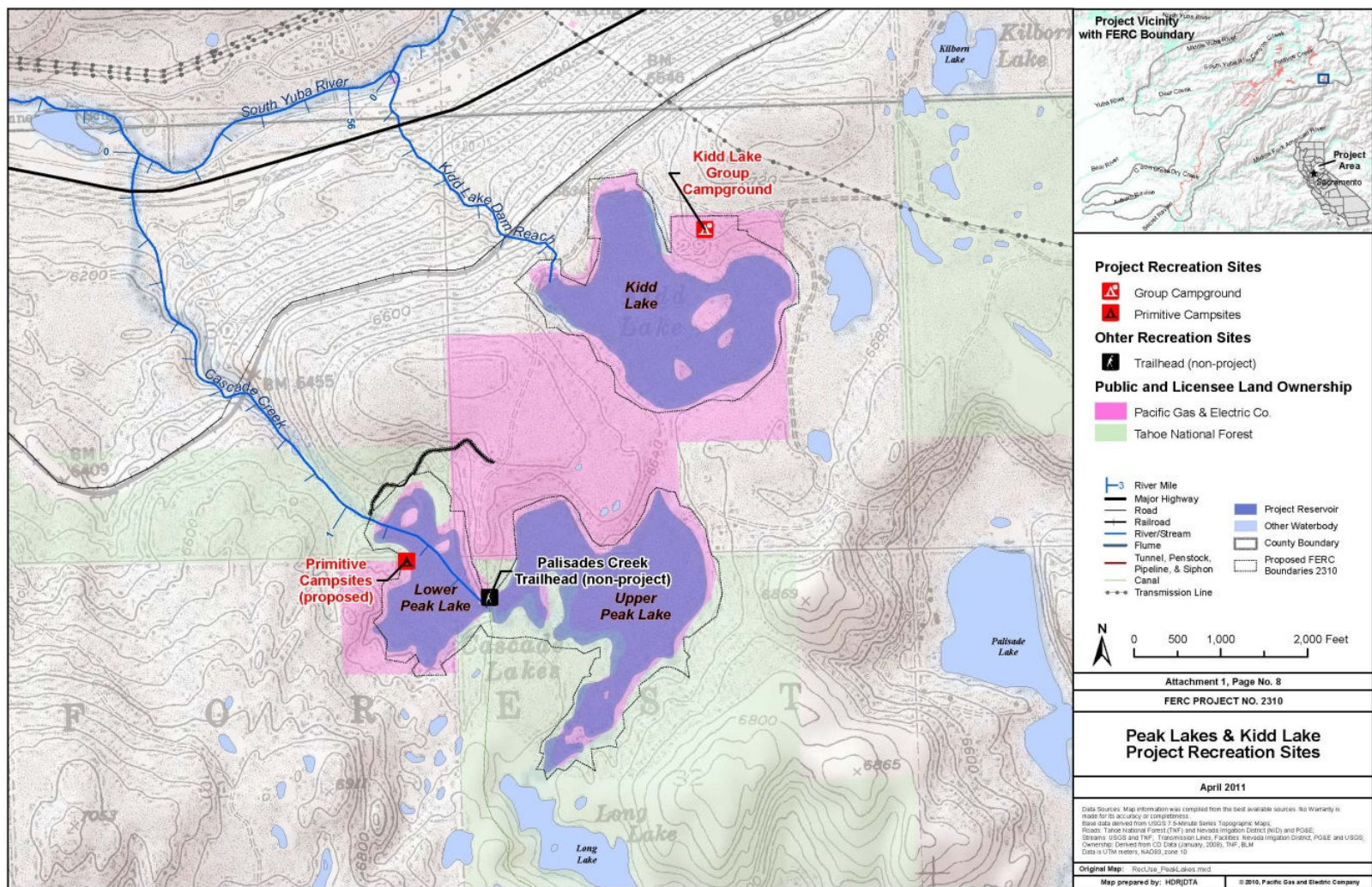


Figure C-8. Existing and proposed recreation facilities at Kidd Lake Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

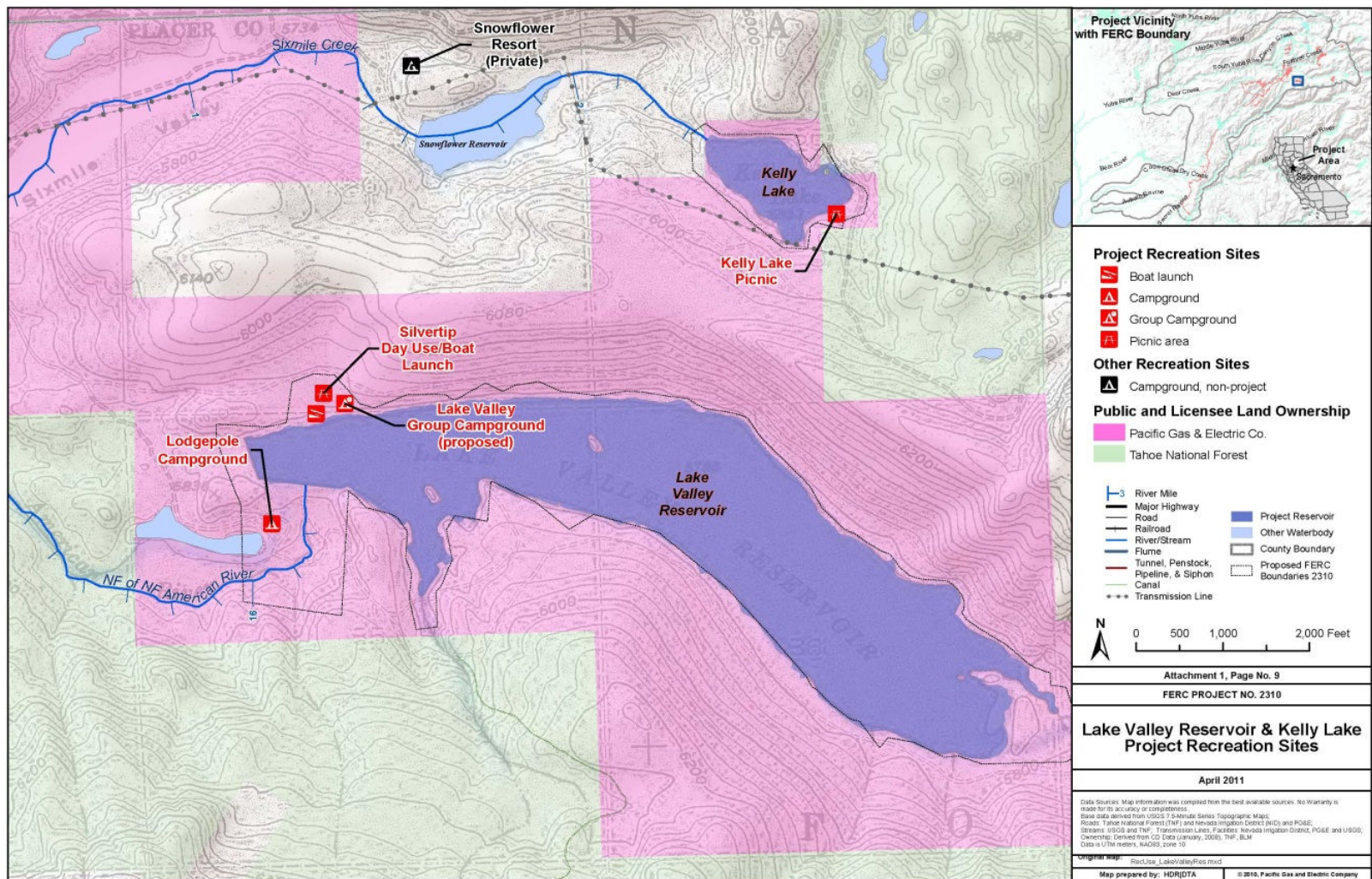


Figure C-9. Existing and proposed recreation facilities at Lake Valley Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

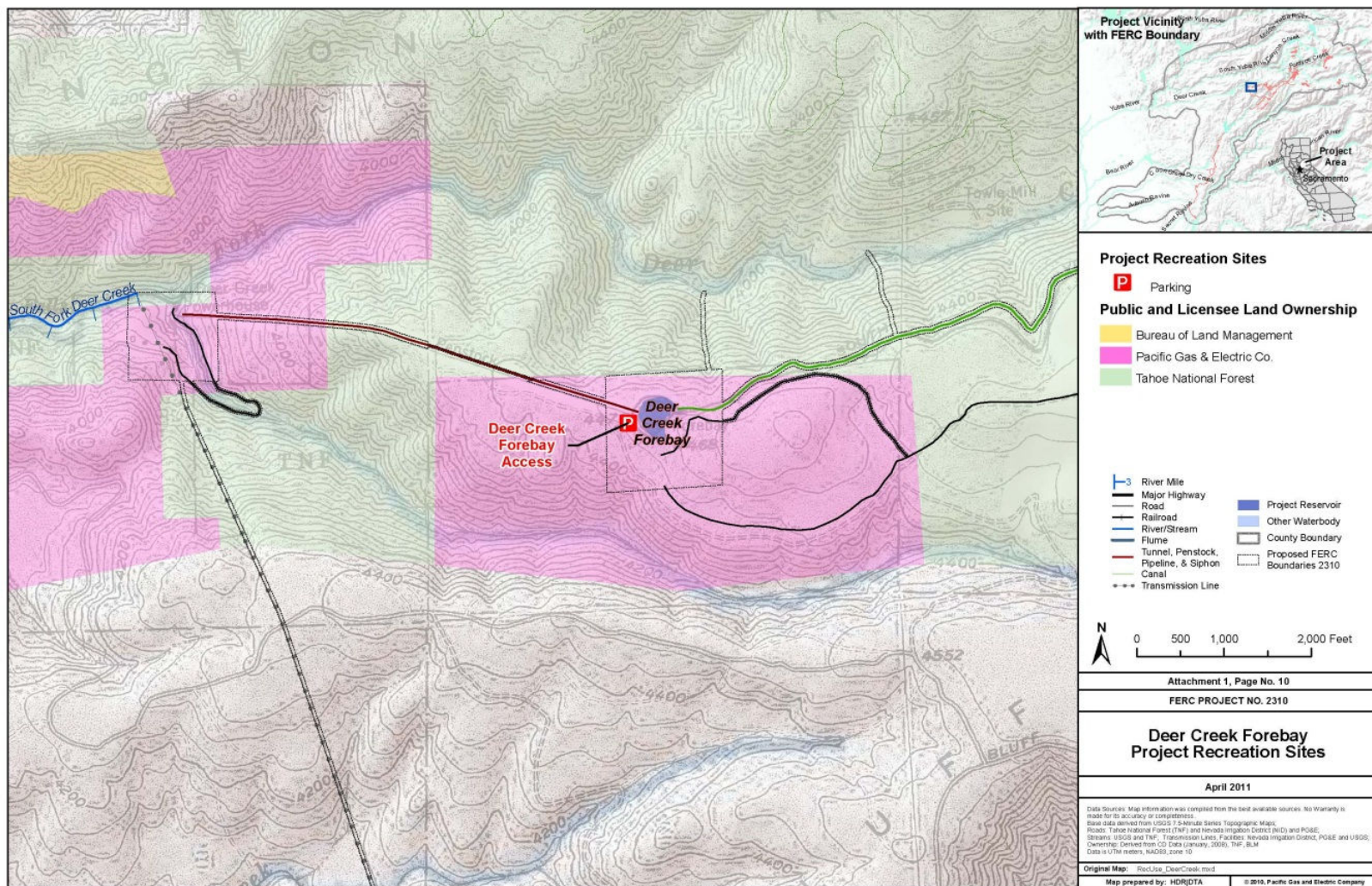


Figure C-10. Existing and proposed recreation facilities at Alta-Drum Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

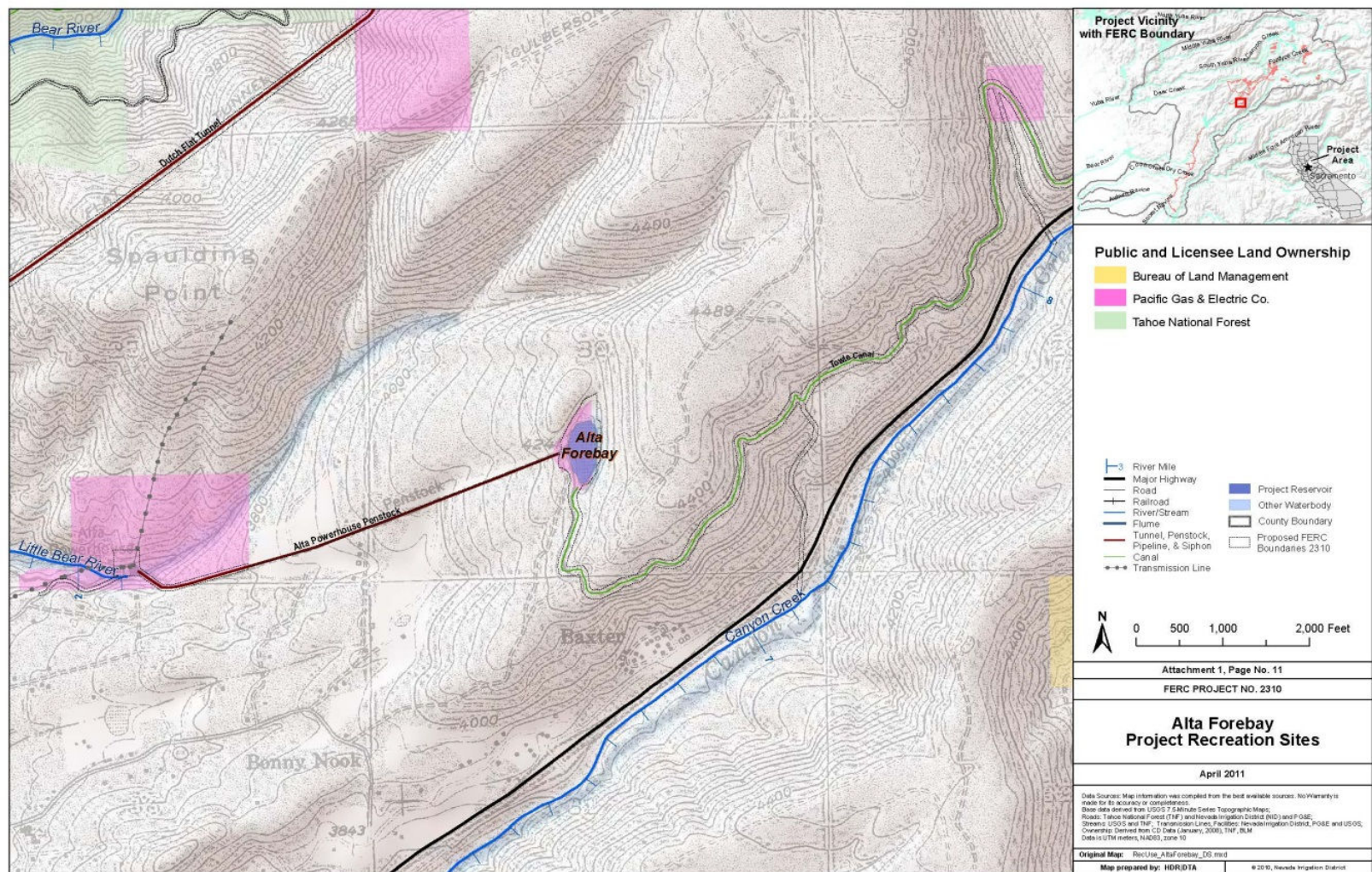


Figure C-11. Existing and proposed recreation facilities at Alta-Drum Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

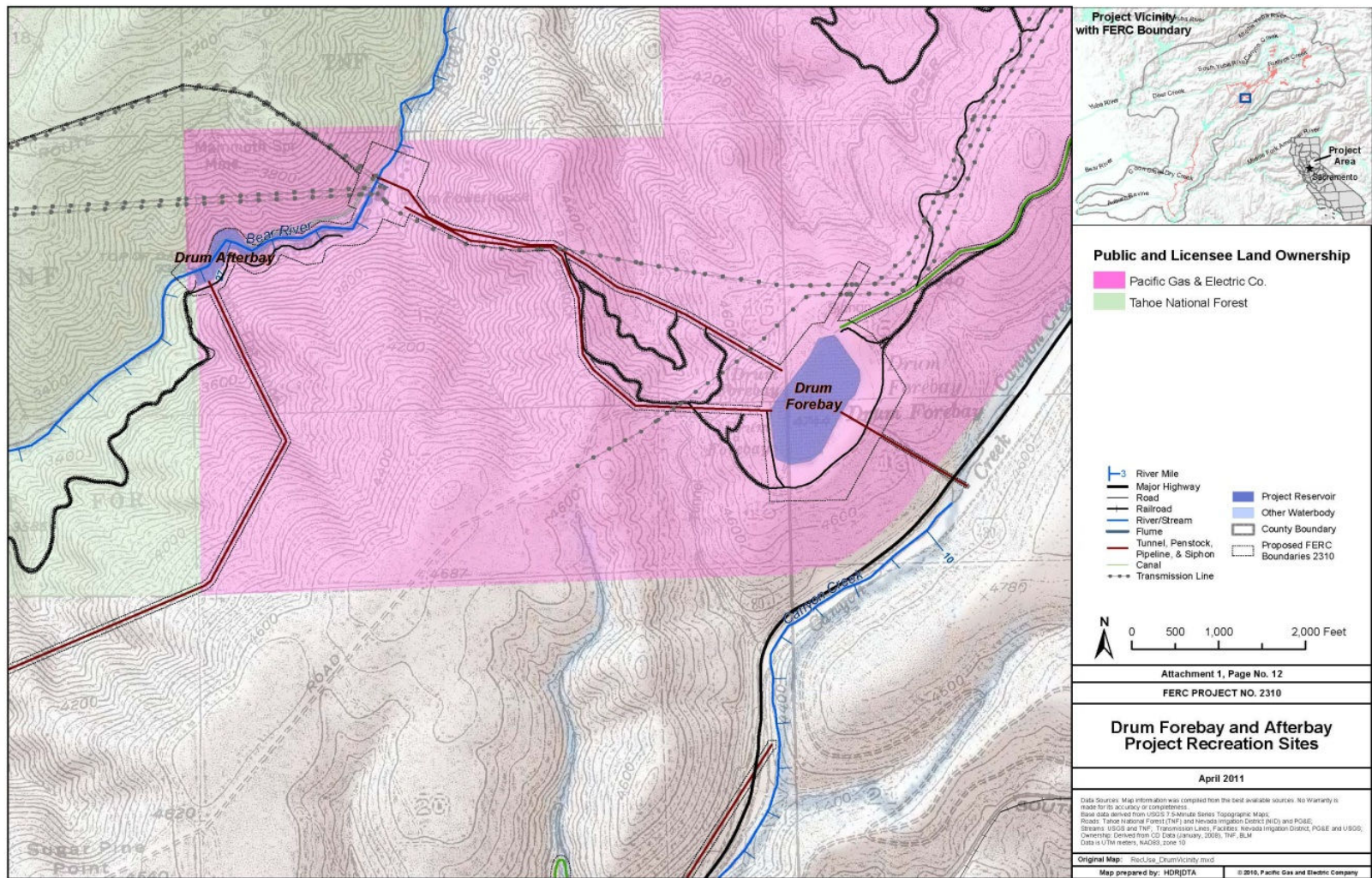


Figure C-12. Existing and proposed recreation facilities at Alta-Drum Recreation Area, Drum-Spaulding Project. (Source: PG&E, 2011)

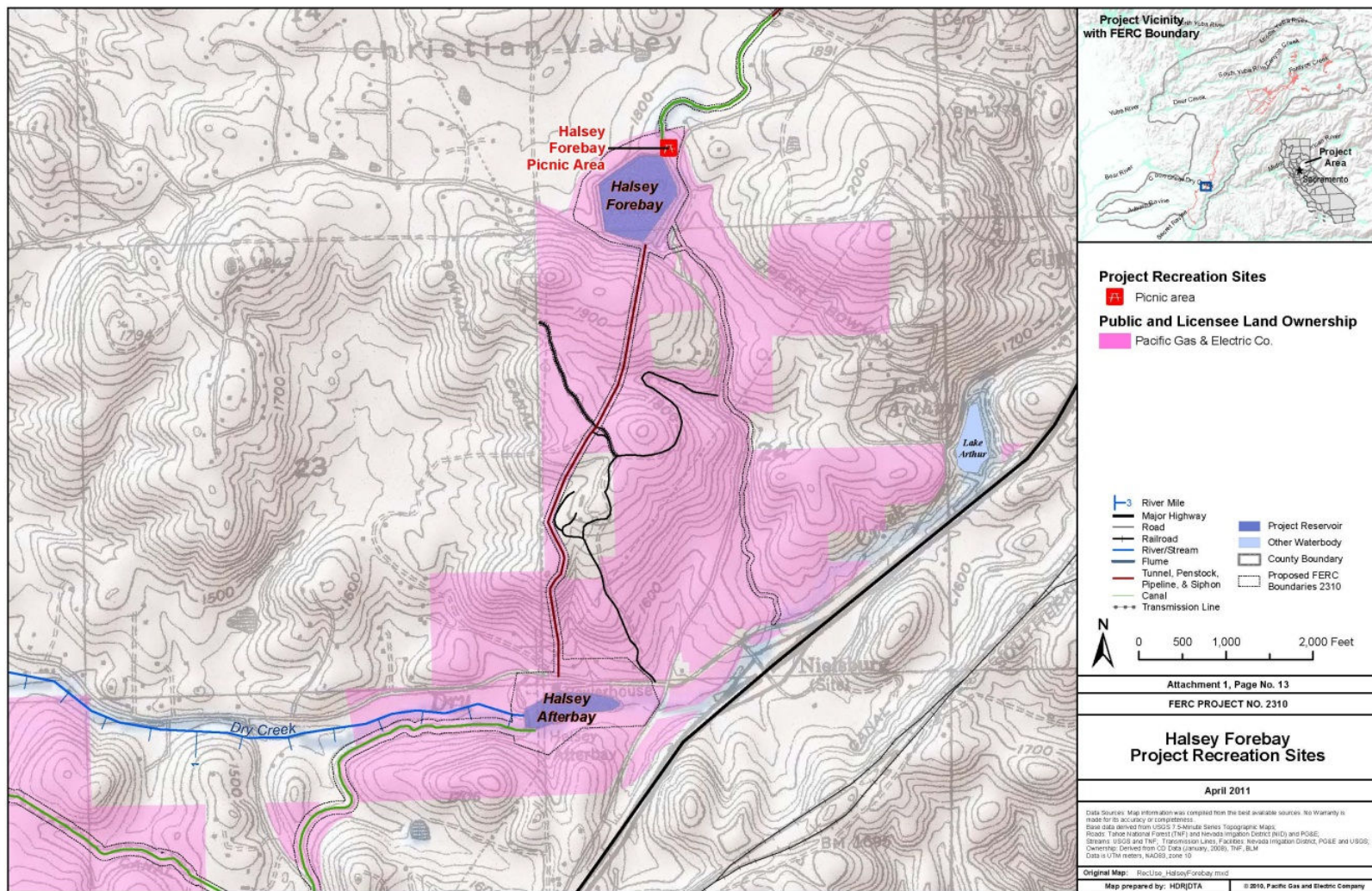


Figure C-13. Existing and proposed recreation facilities at Alta-Drum and Halsey Forebay Recreation Areas, Drum-Spaulding Project. (Source: PG&E, 2011)

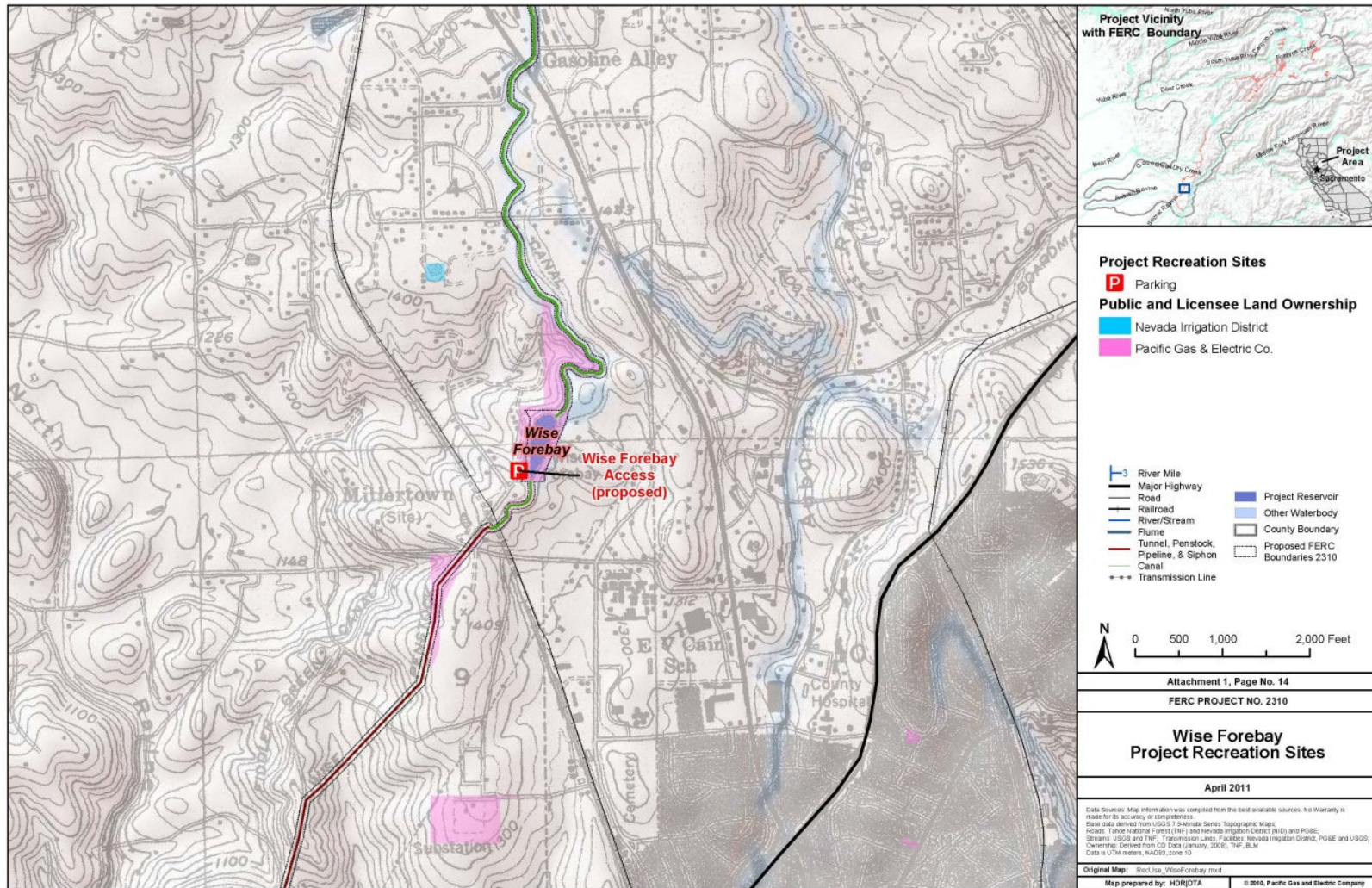


Figure C-14. Existing and proposed recreation facilities at Alta-Drum Recreation Area, Drum-Spaulling Project. (Source: PG&E, 2011)

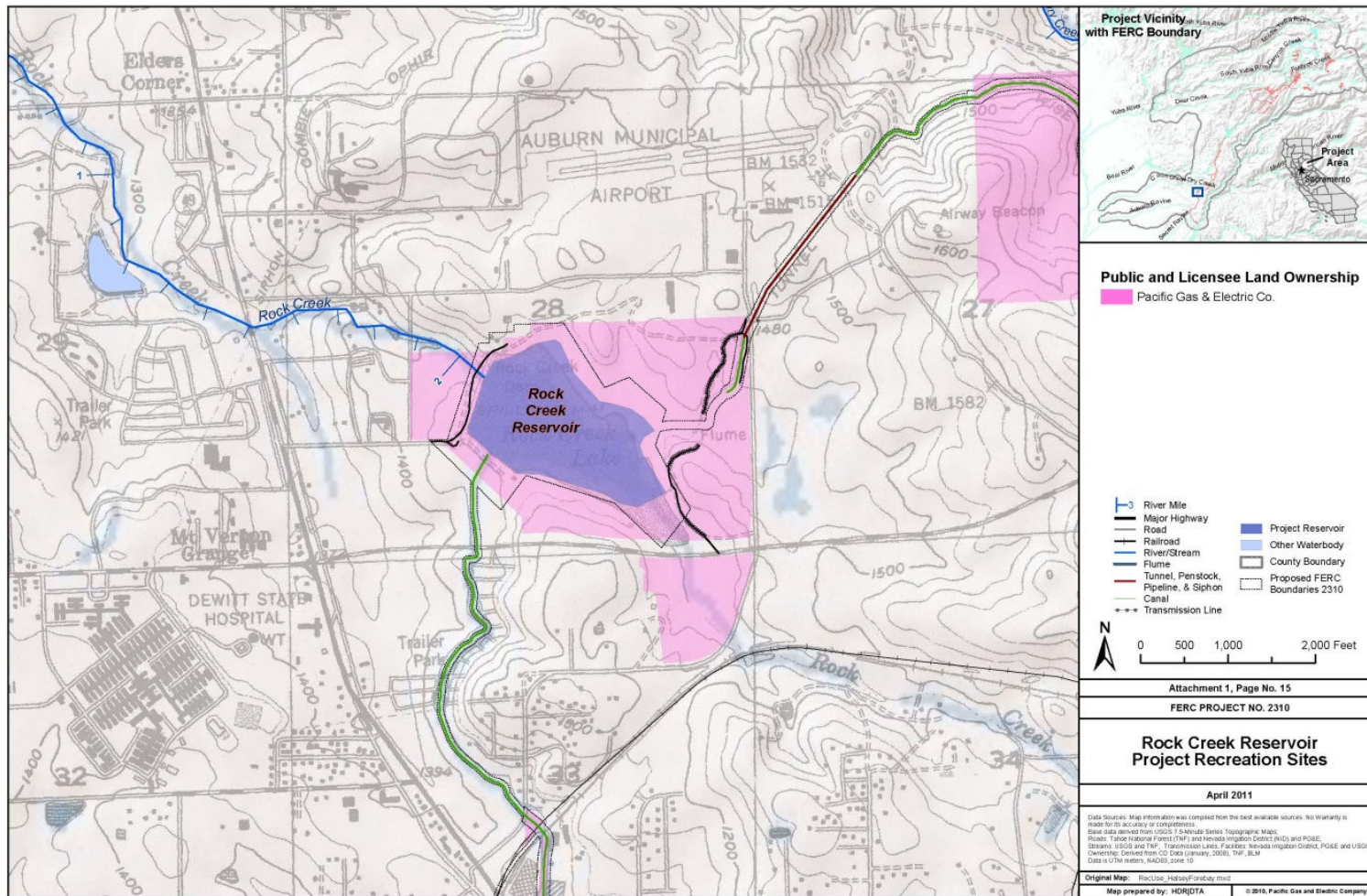


Figure C-15. Existing and proposed recreation facilities at Rock Creek Recreation Area, Drum-Spauding Project. (Source: PG&E, 2011)

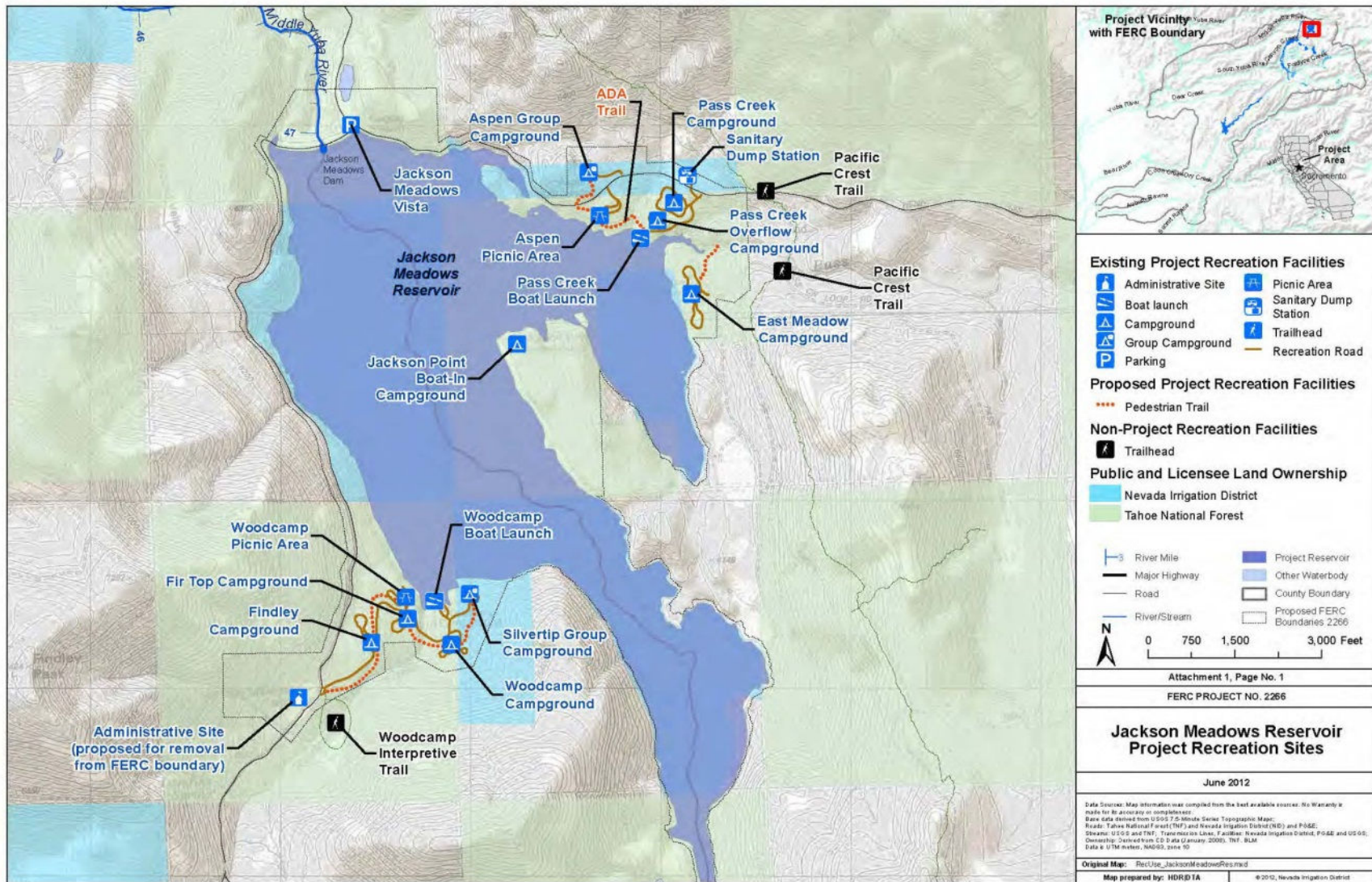


Figure C-16. Existing and proposed recreation facilities at Jackson Meadows Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

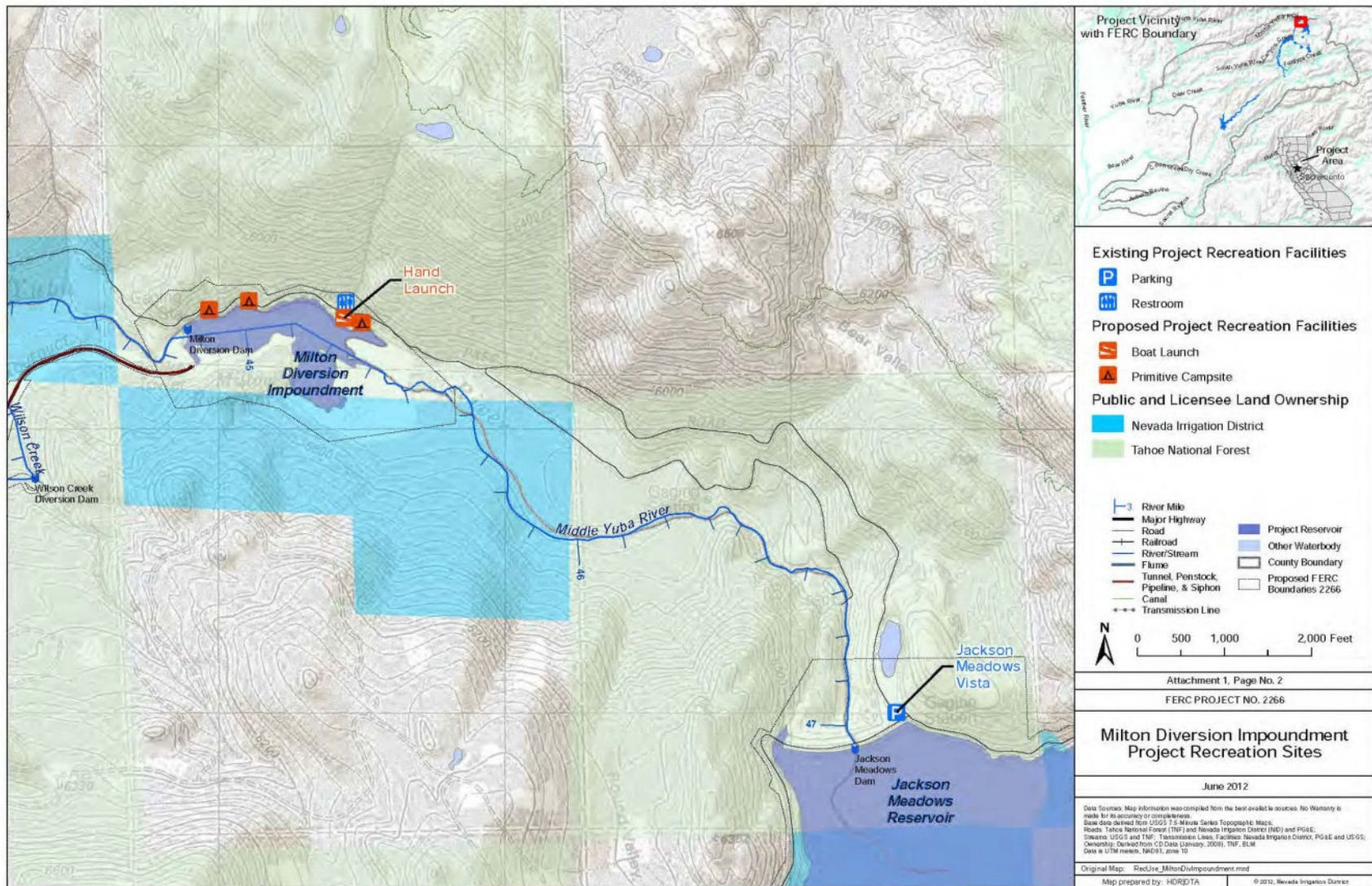


Figure C-17. Existing and proposed recreation facilities at Jackson Meadows Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

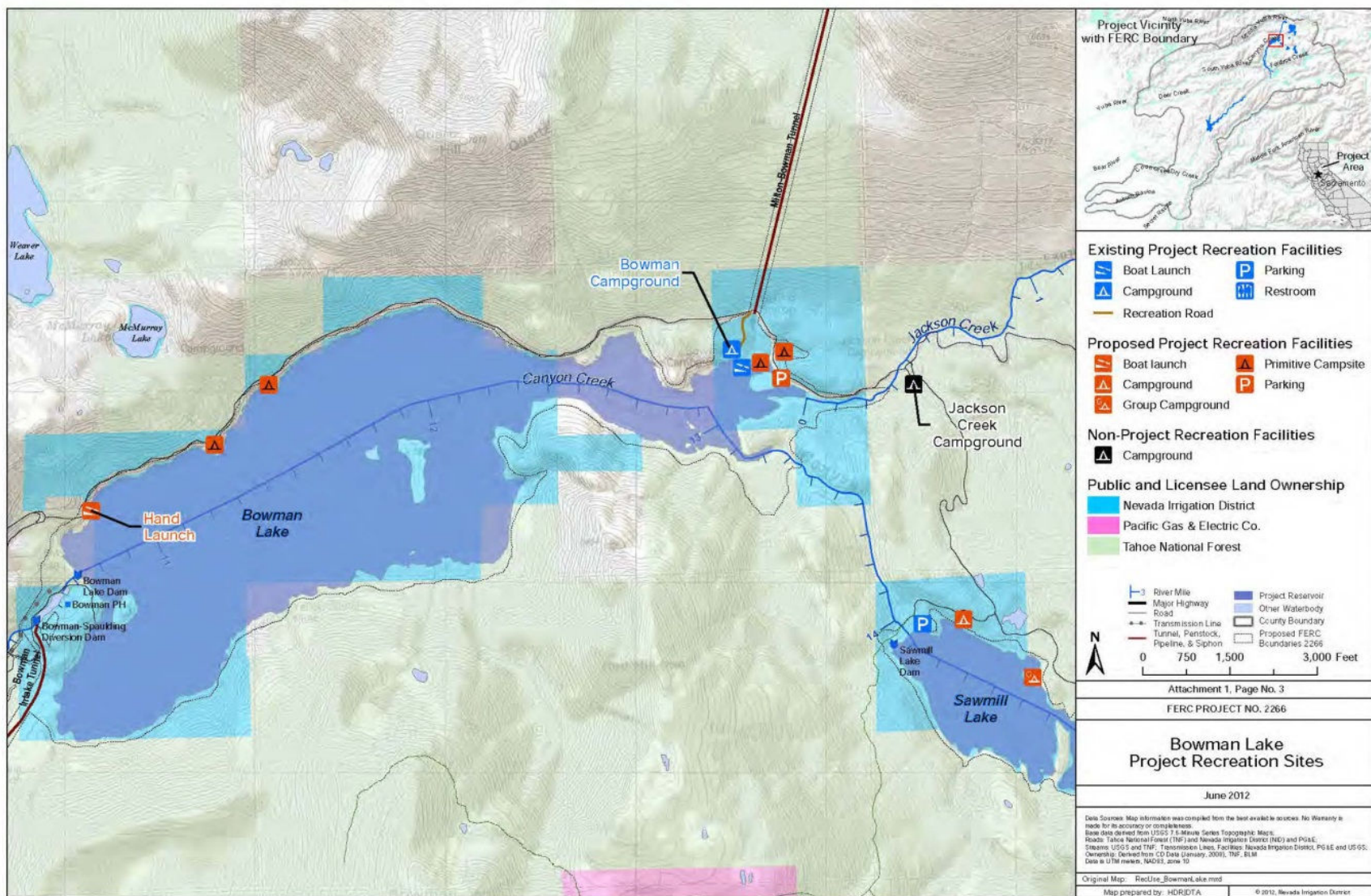


Figure C-18. Existing and proposed recreation facilities at Bowman Lake Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

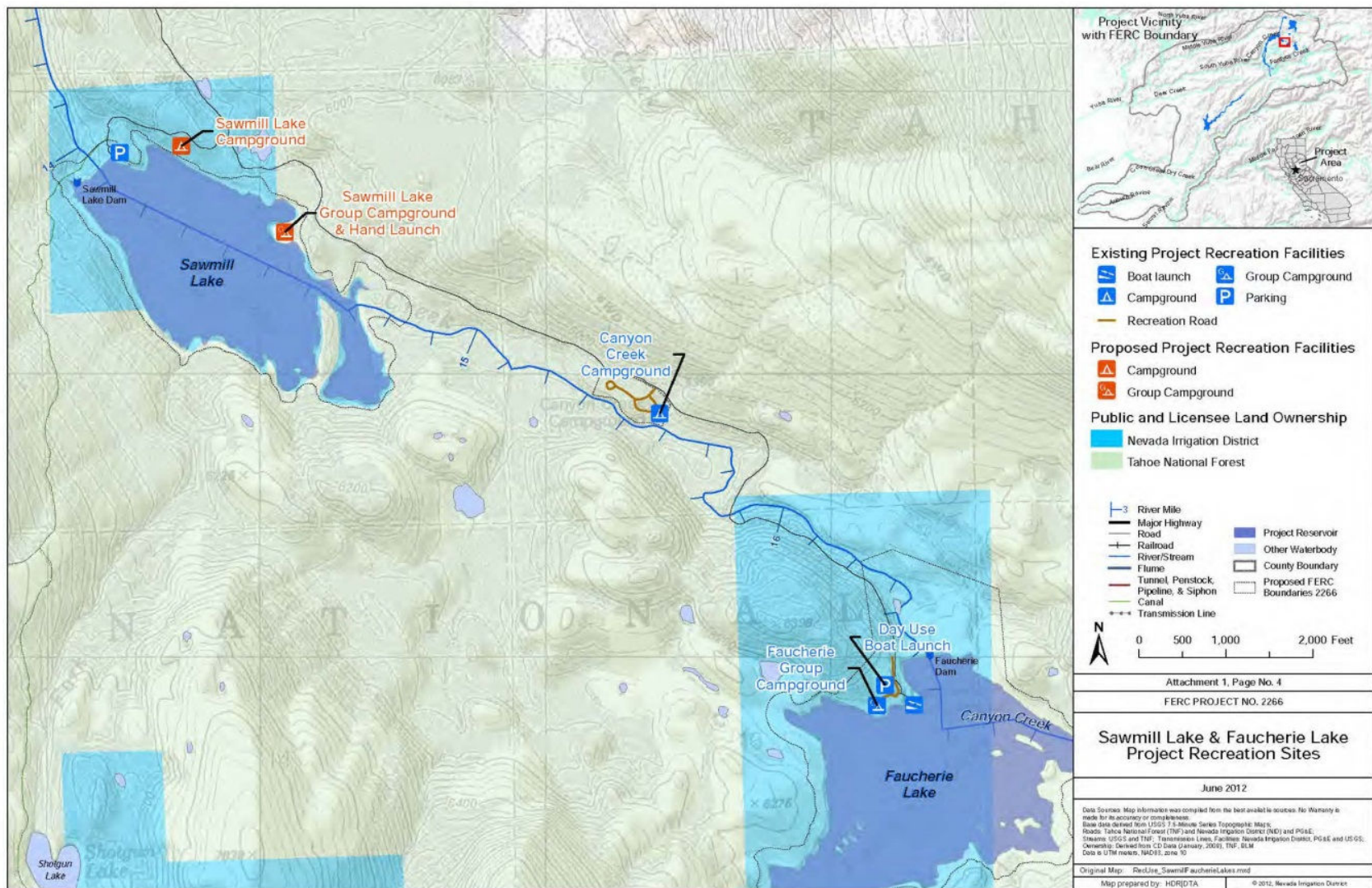


Figure C-19. Existing and proposed recreation facilities at Bowman Lake Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

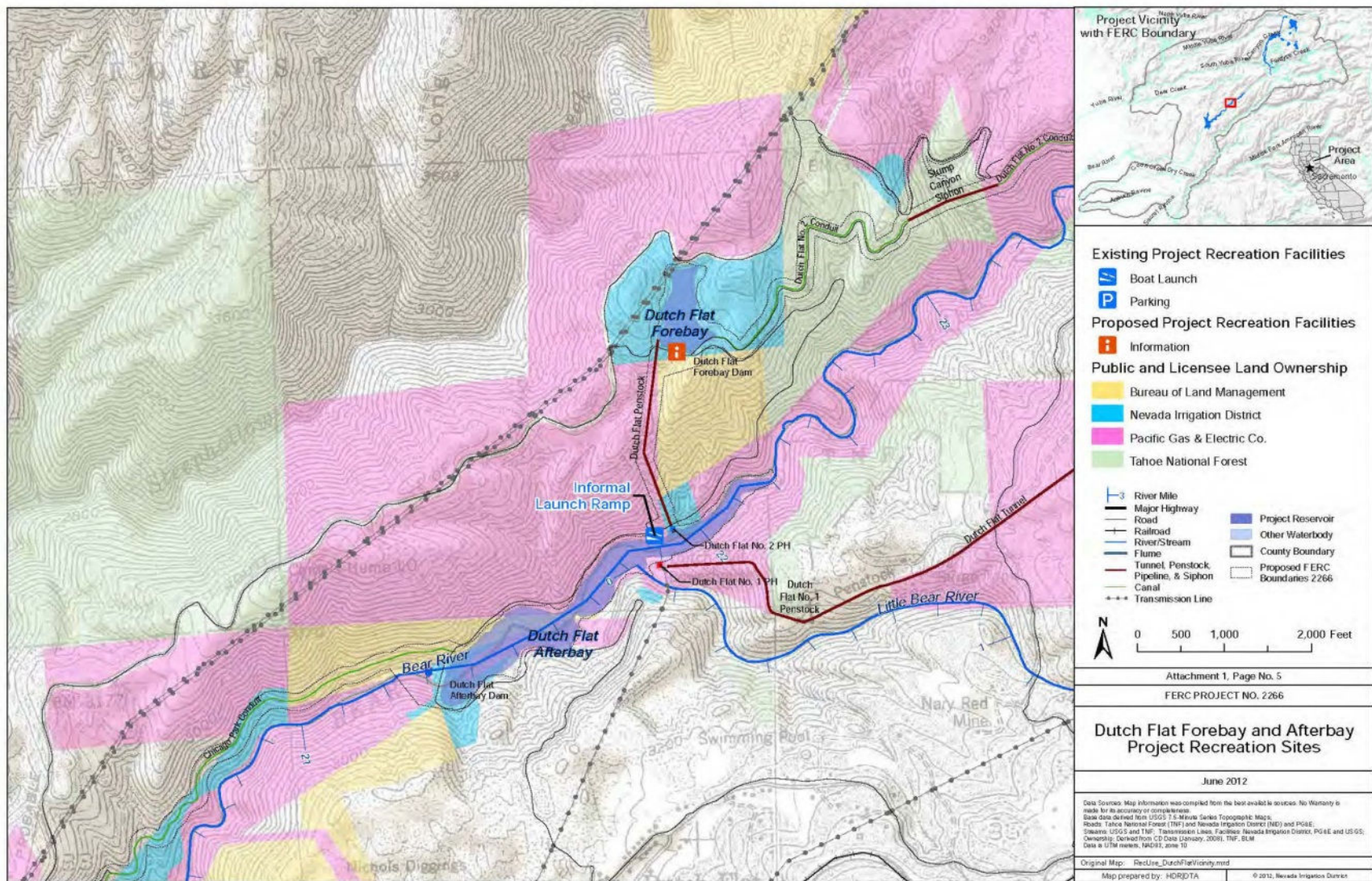


Figure C-20. Existing and proposed recreation facilities at Dutch Flat Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

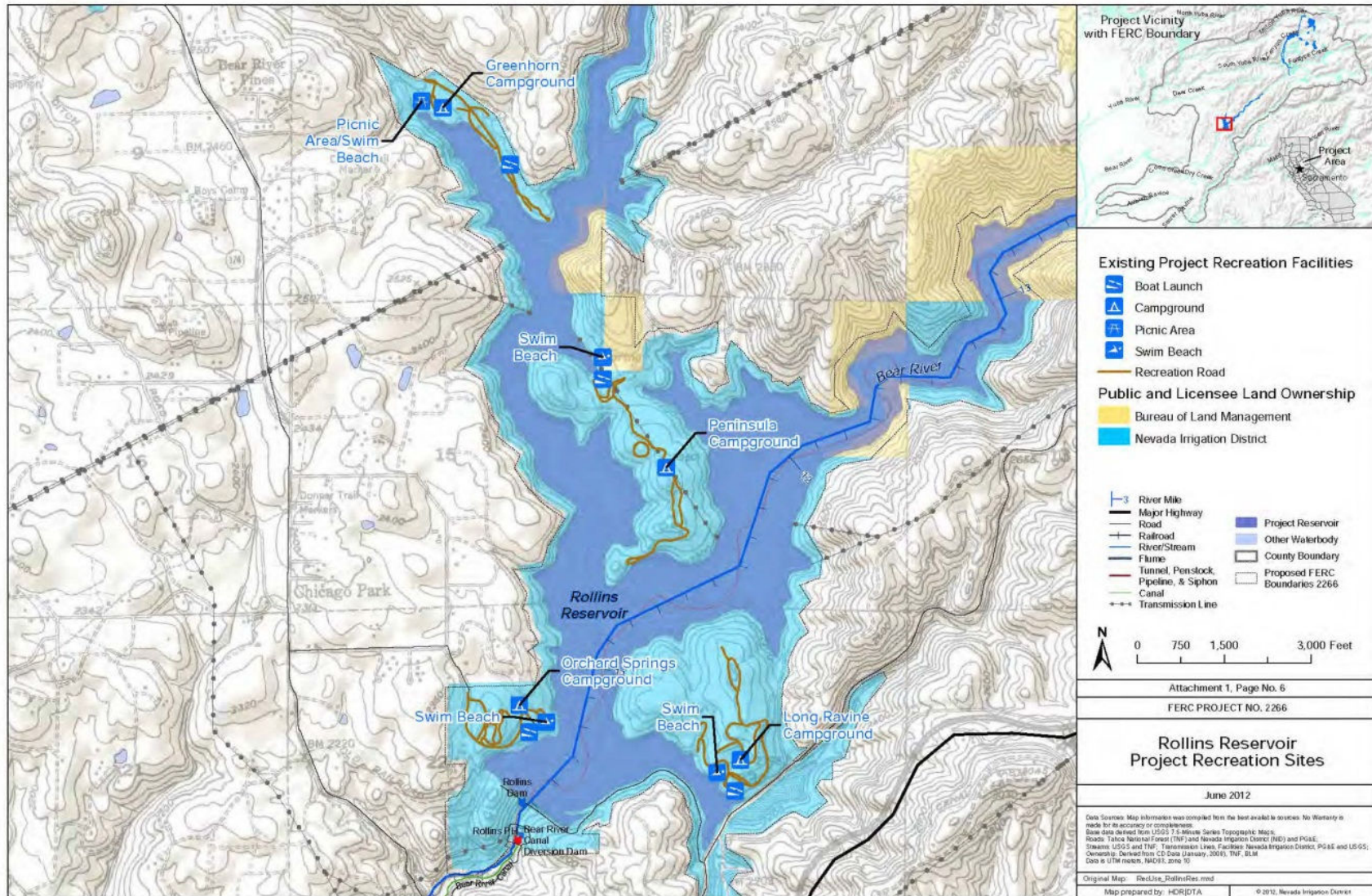


Figure C-21. Existing and proposed recreation facilities at Rollins Reservoir Recreation Area, Yuba-Bear Project. (Source: NID, 2011)

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Appendix D-1

Capital and Annual Costs of Measures for the Drum-Spaulding Project

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Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Annual Consultation with Forest Service, BLM, and Reclamation	PG&E (DS-GEN1); Forest Service (4e #1); BLM (4e #23); Reclamation (4e #b.1); California Fish and Wildlife (10j #1)	Adopt	\$0	\$0	\$30,000	\$0	\$30,000	
Annual Employee Training	PG&E (DS-GEN2); Forest Service (4e #28); BLM (4e #1); California Fish and Wildlife (10j #1.1)	Adopt	\$0	\$0	\$60,000	\$0	\$60,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Develop and Implement Coordinated Operations Plan for the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project	PG&E (DS-GEN3); Forest Service (4e #28); BLM (4e #2) ; California Fish and Wildlife (10j #1.2)	Adopt	\$60,000	\$11,000	\$10,000	\$0	\$21,000	
Implement Erosion Control and Slope Maintenance Plan; Erosion and Sediment Control and Management; Slope Assessment and Facility Release Access Plan; Slope Assessment and Facility Release Point Plan; Slope Stability Plan	PG&E (no measure #); Forest Service (4e #26 and #27; BLM (4e #19 and #50); California Fish and Wildlife (10j #22 and #27)	Adopt	\$2,000,000	\$381,000	\$19,000	\$0	\$400,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Watershed Restoration Plan	California Fish and Wildlife (10j #28)	Do not adopt	\$750,000	\$143,000	\$37,000	\$0	\$180,000	
Streamflows (Part I: Water Year Types)	PG&E (DS-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.1)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	
Streamflows (Part 2: Minimum Streamflows)	PG&E (DS-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.2)	Adopt	\$15,350,000	\$2,922,000	\$50,000	\$0	\$2,972,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Minimum streamflows below Bowman Lake and Lake Spaulding for temperature management	NMFS (10j #4.1)	Do not adopt	\$1,000,000	\$190,000	\$10,000	\$0	\$200,000	
Minimum streamflows below Bowman Lake and Lake Spaulding for Central Valley Steelhead in the absence of Chinook salmon reintroduction	NMFS (10j #6.1)	Do not adopt	\$1,000,000	\$190,000	\$10,000	\$0	\$200,000	
Minimum streamflows in Auburn Ravine, Rock Creek, and Dry Creek	NMFS (10j #7.1)	Do not adopt	\$500,000	\$95,000	\$10,000	\$0	\$105,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Streamflows (Part 3: Flow Setting)	PG&E (DS-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.4)	Adopt	\$10,000	\$2,000	\$300,000	\$0	\$302,000	
Streamflows (Part 4: Canal Outages)	PG&E (DS-AQR1); Forest Service (4e #29); BLM (4e #4); California Fish and Wildlife (10j #2.5)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Streamflows (Part 5: Fordyce Lake Drawdown)	PG&E (DS-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.6)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Streamflows (Part 6: Flow Releases to the Bear River below Drum Canal at YB-137)	PG&E (DS-AQR1); California Fish and Wildlife (10j #2.7)	Adopt	\$50,000	\$10,000	\$5,000	\$0	\$15,000	
Streamflows (Part 7: South Yuba River Spill Cessation and Minimization of Flow Fluctuations)	PG&E (DS-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.8)	Adopt	\$250,000	\$48,000	\$5,000	\$0	\$53,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Fish Protection and Management During Canals Outages Plan	PG&E (DS-AQR2); Forest Service (4e #30); BLM (4e #5); California Fish and Wildlife (10j #3)	Adopt	\$25,000	\$5,000	\$25,000	\$0	\$30,000	
Fish Stocking in Lake Spaulding	PG&E (DS-AQR3)	Do not adopt	\$0	\$0	\$15,000	\$0	\$15,000	
Reservoir fish stocking/Fish Stocking Plan	California Fish and Wildlife (10j #17)	Adopt with modification	\$10,000	\$2,000	\$75,000	\$0	\$77,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Streamflow Measurement (Gage Modifications and Additions)	PG&E (DS-AQR4); Forest Service (4e #31); BLM (4e #9); California Fish and Wildlife (10j #4)	Adopt	\$700,000	\$133,000	\$135,000	\$0	\$268,000	
Install additional streamflow and temperature gaging instruments in the South Yuba River at the confluence of Poorman Creek	NMFS (10j #4.1)	Do not adopt	\$1,000,000	\$190,000	\$150,000	\$0	\$340,000	
Auburn Ravine	PG&E (DS-AQR5); BLM (10a #2)	Adopt	\$135,000	\$26,000	\$20,000	\$0	\$46,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Coordination of the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project Operations Regarding the Yuba-Bear Hydroelectric Project's Minimum Streamflows in the Bear River Below Rollins Reservoir at NID's YB-196 gage (USGS 11422500)	PG&E (DS-AQR6); BLM (4e #3)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Drum-Spaulding Project Compliance with Minimum Streamflows in the Bear River Below Rollins Reservoir at NID's YB-196 gage (USGS 11422500)	California Fish and Wildlife (10j #2.3)	Adopt with modification	\$0	\$0	\$5,000	\$0	\$5,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
South Yuba River Supplemental Flows for Water Temperature Management	Forest Service (4e #29)	Adopt	\$360,000	\$69,000	\$80,000	\$0	\$149,000	Water temperature monitoring and logging included in Aquatic Monitoring Plan
Block Flows for Water Temperature Management in the South Yuba River	California Fish and Wildlife (10j #2.9)	Do not adopt	\$370,000	\$70,000	\$90,000	\$0	\$160,000	
Ecological Group	Forest Service (4e #29); BLM (4e #7); California Fish and Wildlife (10j #2.10)	Adopt with modification	\$85,000	\$16,000	\$45,000	\$0	\$61,000	PG&E proposed alternative focused only on the South Yuba River Supplemental Flow management and evaluation

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Aquatic Invasive Species Management	PG&E (no measure #); Forest Service (4e #33); California Fish and Wildlife (10j #6)	Adopt	\$25,000	\$5,000	\$15,000	\$0	\$20,000	
Aquatic Monitoring Plan (PG&E)	PG&E (no measure #)	Adopt with modification	\$565,000	\$108,000	\$185,000	\$0	\$293,000	
Monitoring Program (Forest Service and California Fish and Wildlife)	Forest Service (4e #35); California Fish and Wildlife (10j #8)	Do not adopt	\$1,130,000	\$215,000	\$740,000	\$0	\$955,000	
Large Woody Debris Management Plan	Forest Service (4e #36)	Adopt with modification	\$40,000	\$8,000	\$65,000	\$0	\$73,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Large Woody Debris Management Plan	California Fish and Wildlife (10j #9)	Adopt	\$40,000	\$8,000	\$50,000	\$0	\$58,000	
Large Woody Debris Management Plan	NMFS (10j #4.2.1 and 4.2.2)	Do not adopt	\$50,000	\$20,000	\$60,000	\$0	\$80,000	
Coarse Substrate Management Plan	NMFS (10j #4.3)	Do not adopt	\$50,000	\$10,000	\$60,000	\$0	\$70,000	
Adaptive Management Plan	NMFS (10j #4.4)	Do not adopt	\$100,000	\$19,000	\$10,000	\$0	\$29,000	
Annual Review of Ecological Conditions	California Fish and Wildlife (10j #10)	Adopt with staff modification	\$0	\$0	\$15,000	\$0	\$15,000	Include as part of annual consultation meeting
Penstock and Other Drainage Structure Emergency and Maintenance Release Points	California Fish and Wildlife (10j #11)	Adopt with modification	\$250,000	\$48,000	\$25,000	\$0	\$73,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Integrated Vegetation Management Plan	PG&E (DS-TR1); Forest Service (4e #34); BLM (4e #17 and 23); California Fish and Wildlife (10j #7.1)	Adopt	\$250,000	\$48,000	\$45,000	\$0	\$93,000	
Monitor Animal Losses in Project Canals	PG&E (DS-TR2); Forest Service (4e #34); BLM (4e #12); California Fish and Wildlife (10j #7.2)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Consult with California Fish and Wildlife When Replacing Wildlife Escape and Wildlife Crossing Facilities	PG&E (DS-TR3); Forest Service (4e #34); BLM (4e #11); California Fish and Wildlife (10j #7.5)	Adopt	\$0	\$0	\$4,000	\$0	\$4,000	
Bear River Management through Bear Valley (Bear River Flow Management, including Drum Canal Operations)	PG&E (DS-TR4A); Forest Service (10a #5)	Adopt	\$1,460,000	\$278,000	\$0	\$0	\$278,000	
Bear River Management through Bear Valley (Bear River Flow Management, including Drum Canal Operations)	California Fish and Wildlife (10j #7.6)	Adopt with modifications	\$1,500,000	\$286,000	\$40,000	\$0	\$326,000	Adopt Forest Service and PG&E proposals which provide better detail.

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Bear River Management through Bear Valley (Baseline and Ongoing Monitoring of Channel Morphology and Riparian Vegetation Assessment in Bear Valley Meadow)	PG&E (DS-TR4B); Forest Service (4e #34); Forest Service (10a #8)	Adopt	\$135,000	\$26,000	\$40,000	\$0	\$66,000	Adopt Forest Service (4e) No. 34 and Forest Service (10a) recommendation 5, which includes the PM&E and provides additional monitoring detail.
Implement Bald Eagle Management Plan	PG&E (DS-TR5); Forest Service (4e #34); BLM (4e #16); California Fish and Wildlife (10j #7.7)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Aquatic Monitoring Program (Only Foothills Yellow-Legged Frog and Western Pond Turtle)	Forest Service (4e #35); California Fish and Wildlife (10j #8)	Adopt with modifications	\$70,000	\$13,000	\$10,000	\$0	\$23,000	Adopt PG&E alternative to Forest Service (4e) 35, California Fish and Wildlife (10j) 8
Protection of Special Status Species	Forest Service (4e #12 and 34); BLM (4e #13 and #33); California Fish and Wildlife (10j #7.8 and #12)	Do not adopt	\$0	\$0	\$0	\$0	\$0	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Annual Review of Special Status Species	Forest Service (4e #34); BLM (4e #14); California Fish and Wildlife (10j #7.9)	Adopt	\$0	\$0	\$16,000	\$0	\$16,000	
Pesticide Use Restrictions	Forest Service (4e #16); BLM (4e #37); California Fish and Wildlife (10j #16)	Adopt	\$0	\$0	\$0	\$0	\$0	
Pesticide Use Restrictions on Reclamation Lands	Reclamation (4e #b.9)	adopt	\$0	\$0	\$10,000	\$0	\$10,000	
Project Powerlines	Forest Service (4e #34); BLM (4e #15)	Adopt	\$0	\$0	\$66,000	\$0	\$66,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Project Powerlines	California Fish and Wildlife (10j #7.10)	Do not adopt	\$0	\$0	\$7,000	\$0	\$7,000	
Raptor Collision	Forest Service (4e #34); BLM (4e #15); California Fish and Wildlife (10j #7.11)	Adopt	\$0	\$0	\$7,000	\$0	\$7,000	
Bat Management	Forest Service (4e #34); California Fish and Wildlife (10j #7.12)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	
Eradicate Bullfrogs	FWS (10a #2)	Do not adopt	\$0	\$0	\$0	\$0	\$0	
Wildlife Protection	FWS (10a #3)	Do not adopt	\$0	\$0	\$0	\$0	\$0	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Wildlife Crossings (Drum, South Yuba, and Towle Canal)	Forest Service (4e # 34); California Fish and Wildlife (10j #7.3)	Do not adopt	\$700,000	\$133,000	\$0	\$0	\$133,000	
Wildlife Crossing (Bear River and South Canal)	Forest Service (4e #34); (California Fish and Wildlife (10j #7.4)	Do not adopt	\$750,000	\$143,000	\$0	\$0	\$143,000	
Wildlife Crossing (Bear River and South Canal)	PG&E alternative (no number)	Adopt	\$150,000	\$29,000	\$20,000	\$0	\$49,000	
Wildlife Crossings (Bear River and Drum [Chalk Bluff] Canals)	BLM (4e #10)	Do not adopt	\$660,000	\$126,000	\$0	\$0	\$126,000	
Protect and Maintain Natural Ecosystem Processes	FWS (10a #5)	Do not adopt	\$0	\$0	\$0	\$0	\$0	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2011 \$)	Annualized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement PG&E Proposed Recreation Plan	PG&E (DS-RR1);	Adopt with staff modifications	\$5,262,000	\$1,001,000	\$1,100,000	\$0	\$2,101,000	Costs for individual plan component are itemized below.
Implement Agency Recommended Recreation Plan	Forest Service (4e #41); BLM (4e #6); California Fish and Wildlife (10j #16)	Adopt with staff modifications	\$5,281,000	\$1,004,800	\$1,108,000	\$0	\$2,112,800	Costs for individual plan component are itemized below.
Recreation Plan: White Rock Lake Primitive Campsites	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$30,000	\$6,000	\$20,000	\$0	\$26,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Meadow Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$156,000	\$30,000	\$34,000	\$0	\$64,000	
Recreation Plan: Meadow Lake Shoreline Campsites	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$115,000	\$22,000	\$24,000	\$0	\$46,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Meadow Knoll Group Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$10,000	\$2,000	\$29,000	\$0	\$31,000	
Recreation Plan: Meadow Lake Picnic Area (proposed) ¹	PG&E (DS-RR1)	Adopt	\$45,000	\$9,000	\$22,000	\$0	\$31,000	

¹ Cost estimates provided by PG&E and no recommendation or improvements were provided in the Recreation Plan

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Meadow Lake Dispersed Sites and Signage	PG&E (DS-RR 1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$55,000	\$10,000	\$27,000	\$0	\$37,000	
Recreation Plan: Lake Sterling Campground Conversion	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$150,000	\$29,000	\$29,000	\$0	\$58,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2011 \$)	Annualized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Lake Sterling Primitive Campsites	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$4,000	\$1,000	\$25,000	\$0	\$26,000	
Recreation Plan: Lake Sterling Dam Railing ²	PG&E (DS-RR1)	Adopt	\$270,000	\$51,000	\$1,000	\$0	\$52,000	
Recreation Plan: Fordyce Lake Primitive Campground (proposed)	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$95,000	\$18,000	\$23,000	\$0	\$41,000	

² Cost estimates provided by PG&E and no recommendation or improvements were provided in the Recreation Plan

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Fordyce Lake OHV Signage	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$5,000	\$1,000	\$3,000	\$0	\$4,000	
Recreation Plan: Lake Spaulding Campground	PG&E (DS-RR1)	Adopt with staff modification	\$270,000	\$51,000	\$53,000	\$0	\$104,000	
Lake Spaulding Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$300,000	\$57,000	\$58,000	\$0	\$115,000	
Recreation Plan: Lake Spaulding Boat-in Campground (proposed)	PG&E (DS-RR1)	Adopt with staff modification	\$95,000	\$18,000	\$33,000	\$0	\$51,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Lake Spaulding Boat-In Campground (proposed)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$115,000	\$22,000	\$33,000	\$0	\$55,000	
Recreation Plan: Lake Spaulding Boat Launch	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$246,000	\$47,000	\$89,000	\$0	\$136,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Bear Valley Group Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$31,000	\$6,000	\$49,000	\$0	\$55,000	
Recreation Plan, Bear River Corridor: Bear River Trail Project	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Sierra Discovery Trail	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modifications	\$75,000	\$14,000	\$42,000	\$0	\$56,000	
Recreation Plan: Fuller Lake Day Use and Boat Launch	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$311,000	\$59,000	\$40,000	\$0	\$99,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Fuller Lake Angler Access	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modifications	\$13,000	\$2,000	\$19,000	\$0	\$21,000	
Recreation Plan: Rucker Lake Walk-In Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$38,000 ³	\$7,000	\$29,000	\$0	\$36,000	.

³ This cost was provided by PG&E in its Amended License Application filed on June 18, 2012, and its Supplement to the Amended License Application filed on August 30, 2012; however, this cost appears to reflect PG&E's original proposal for this facility instead of the cost for the revised proposal for this facility as provided in the Revised Recreation Facilities Plan submitted on August 29, 2012.

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Rucker Lake Campground Conversion (proposed)	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$900,000	\$171,000	\$30,000	\$0	\$201,000	
Recreation Plan: Blue Lake	PG&E (DS-RR1)	Adopt	\$1,000	\$0	\$10,000	\$0	\$10,000	
Blue Lake	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
Recreation Plan: Carr Lake Walk-In Campground	PG&E (DS-RR1)	Adopt	\$158,000	\$30,000	\$16,000	\$0	\$46,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Carr Lake Walk-In Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$130,000	\$25,000	\$10,000	\$0	\$35,000	
Recreation Plan: Carr-Feeley Trailhead	PG&E (DS-RR1-20); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modifications	\$1,000	\$0	\$13,000	\$0	\$13,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Lower Lindsey Lake Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$126,000	\$24,000	\$21,000	\$0	\$45,000	
Recreation Plan: Lindsey Creek Campground (including Lower Lindsey trailhead)	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$532,000	\$101,000	\$43,000	\$0	\$144,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: M. Lindsey, Culbertson, Rock Lakes Primitive Walk-In Campsites	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$1,000	\$0	\$12,000	\$0	\$12,000	
Recreation Plan: Kidd Lake Group Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$51,000	\$10,000	\$68,000	\$0	\$78,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Peak and Kidd Lakes	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
Recreation Plan: Upper Peak Lake Shoreline Access	PG&E (DS-RR1)	Adopt	\$6,000	\$1,000	\$4,000 ⁴	\$0	\$5,000	
Recreation Plan: Lower Peak Lake Primitive Campsites (proposed)	PG&E (DS-RR1)	Adopt with staff modification	\$6,000	\$1,000	\$5,000	\$0	\$6,000	
Recreation Plan: Kelly Lake Picnic Area	PG&E (DS-RR1)	Adopt	\$16,000	\$3,000	\$10,000	\$0	\$13,000	

⁴ This cost was provided by PG&E in its Amended License Application filed on June 18, 2012, and its Supplement to the Amended License Application filed on August 30, 2012; however, this cost appears to reflect PG&E's original proposal for this facility instead of the cost for the revised proposal for this facility as provided in the Revised Recreation Facilities Plan submitted on August 29, 2012.

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Lodgepole Campground	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$98,000	\$19,000	\$66,000	\$0	\$85,000	
Recreation Plan: Silvertip Day Use and Boat Launch	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$1,184,000	\$225,000	\$46,000	\$0	\$271,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Lake Valley Group Campground (proposed)	PG&E (DS-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$127,000	\$24,000	\$68,000	\$0	\$92,000	
Recreation Plan: Alta Forebay	PG&E (DS-RR1)	Adopt with staff modification	\$2,000	\$1,000	\$1,000	\$0	\$2,000	
Recreation Plan: Drum Forebay	PG&E (DS-RR1)	Adopt with staff modification	\$2,000	\$1,000	\$4,000	\$0	\$5,000	
Recreation Plan: Drum Afterbay	PG&E (DS-RR1)	Adopt	\$0	\$0	\$1,000	\$0	\$1,000	
Recreation Plan: Halsey Afterbay	PG&E (DS-RR1)	Adopt	\$0	\$0	\$1,000	\$0	\$1,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Recreation Plan: Wise Forebay Shoreline Parking Area (proposed)	PG&E (DS-RR1)	Adopt	\$28,000	\$5,000	\$6,000	\$0	\$11,000	
Recreation Plan: Halsey Forebay Picnic Area	PG&E (DS-RR1)	Adopt	\$9,000	\$2,000	\$78,000	\$0	\$80,000	
Recreation Plan: Rock Creek Reservoir	PG&E (DS-RR1)	Adopt	\$0	\$0	\$6,000	\$0	\$6,000	
Recreation Survey, Monitoring, and Future Development Triggers	Forest Service (4e #37); California Fish and Wildlife (10j #12)	Adopt with staff modification	\$0	\$0	\$20,000	\$0	\$20,000	
Licensee Contact	Forest Service (4e #38); BLM (4e #48)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Review of Recreation Developments	Forest Service (4e #39); California Fish and Wildlife (10j #14)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	
Annual Recreation Coordination Meeting	Forest Service (4e #40); California Fish and Wildlife (10j #15)	Adopt	\$0	\$0	\$6,000	\$0	\$6,000	
Provide Potable Water (15 service connections or 25 persons)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$50,000	\$10,000	\$120,000	\$0	\$130,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Food Lockers	Forest Service (4e #41) ; California Fish and Wildlife (10j #16)	Adopt	\$10,000	\$2,000	\$0	\$0	\$2,000	
Facility Plans	Forest Service (4e #41) ; California Fish and Wildlife (10j #16)	Do not adopt	\$10,000	\$2,000	\$0	\$0	\$2,000	
Public Information and Education	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with staff modification	\$10,000	\$2,000	\$3,000	\$0	\$5,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Plan addressing Costs of Managing Project-Related Recreation	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$8,000	\$1,000	\$0	\$0	\$1,000	
Recreation Operation, Maintenance, and Administration Agreement	BLM (4e #6)	Adopt	\$30,000	\$6,000	\$30,000	\$0	\$36,000	
Provide Recreation Flow Information	PG&E (DS-RR2)	Adopt	\$0	\$0	\$4,000	\$0	\$4,000	
Implement Transportation Management Plan For Primary Project Roads	PG&E (DS-LU1)	Adopt with staff modification	\$2,240,000	\$426,000	\$380,000	\$0	\$806,000	
Develop/File Road and Transportation Facility and Management Plan	Forest Service (4e #44); BLM (4e #22)	Adopt	\$2,240,000	\$426,000	\$380,000	\$0	\$806,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Fire Prevention and Response Plan on Federal Land	PG&E (DS-LU2)	Adopt with staff modifications	\$0	\$0	\$2,000	\$0	\$2,000	
Implement Historic Properties Management Plan	PG&E (DS-CR1); Forest Service (4e #43); BLM (4e #21)	Do not adopt	\$4,740,000	\$902,000	\$61,000	\$0	\$963,000	Implement within 1 year of license issuance
Implement Historic Properties Management Plan	Staff	Adopt	\$4,740,000	\$902,000	\$61,000	\$0	\$963,000	Implement upon license issuance
Discovery of Cultural Resources	Reclamation (4e #b.11)	Adopt	\$0	\$0	\$61,000	\$0	\$61,000	
Implement Visual Resource Management Plan on Federal Land	PG&E (DS-AER1)	Adopt with staff modification	\$0	\$0	\$3,000	\$0	\$3,000	
Develop/File Fire Management and Response Plan	Forest Service (4e #45); BLM (4e #18)	Adopt	\$0	\$0	\$2,000	\$0	\$2,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Develop/File Visual Resource Management Plan	Forest Service (4e #42); BLM (4e #20)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	
Revise the Project Boundary	PG&E (no measure #)	Adopt	\$0	\$0	\$0	\$0	\$0	
Hazardous Substances Plan; Hazardous materials – take reasonable precautions as to prevent contamination or pollution of Federal lands and waters	Forest Service (4e #23); BLM (4e #49); California Fish and Wildlife (10j #23); Reclamation (4e #b.10)	Adopt	\$60,000	\$11,000	\$0	\$0	\$11,000	
Total Applicant's Proposal			\$29,034,000	\$5,526,000	\$1,980,000	\$7,030,000	\$7,506,000	
Staff Alternative			\$36,632,000	\$6,972,000	\$3,296,000	\$7,030,000	\$10,268,000	

Table D-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Drum-Spaulding Hydroelectric Project. (Source: staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Staff Alternative with 4(e) Mandatory Conditions			\$38,537,000	\$7,334,000	\$3,845,000	\$7,030,000	\$11,179,000	

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Appendix D-2

Capital and Annual Costs of Measures for the Deer Creek Project

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Table D-2. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Deer-Creek Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Annual Consultation with Forest Service and BLM	PG&E (DC-GEN1); Forest Service (4e #1); BLM (4e #23)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Annual Employee Training	PG&E (DC-GEN2); Forest Service (4e #28); BLM (4e #1)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	
Deer Creek Powerhouse Minimum Flow	PG&E (DC-AQR1); Forest Service (4e #29); California Fish and Wildlife (10j #2.2)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	

Table D-2. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Deer-Creek Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annualized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Fish Protection and Management During Canals Outages Plan	PG&E (DC-AQR2); Forest Service (4e #30); BLM (4e #5); California Fish and Wildlife (10j #3)	Adopt with modification	\$0	\$0	\$15,000	\$0	\$15,000	
Develop and Implement Integrated Vegetation Management Plan	PG&E (DC-TR1)	Adopt	\$50,000	\$10,000	\$15,000	\$0	\$25,000	
Monitor Animal Losses in Project Canals	PG&E (DC-TR2)	Do not adopt	\$0	\$0	\$1,000	\$0	\$1,000	
Consult with California Fish and Wildlife When Replacing Wildlife Escape and Wildlife Crossing Facilities	PG&E (DC-TR3)	Adopt	\$0	\$0	\$2,000	\$0	\$2,000	
Recreation Plan: Deer Creek Forebay	PG&E (DC-RR1-1)	Adopt with staff modification	\$2,000	\$1,000	\$4,000	\$0	\$5,000	

Table D-2. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Deer-Creek Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Transportation Management Plan For Primary Project Roads	PG&E (DC-LU1)	Adopt with modification	\$680,000	\$129,000	\$115,000	\$0	\$115,000	Final draft plan submitted within 1 year of license issuance for FERC approval
Implement Fire Prevention and Response Plan on Federal Land	PG&E (DC-LU2)	Adopt with staff modification	\$0	\$0	\$1,000	\$0	\$1,000	Final draft plan submitted within 1 year of license issuance for FERC approval
Implement Historic Properties Management Plan	PG&E (DC-CR1)	Adopt	\$820,000	\$156,000	\$29,000	\$0	\$29,000	
Implement Visual Resource Management Plan on Federal Land	PG&E (DC-AER1)	Adopt with staff modification	\$0	\$0	\$1,000	\$0	\$1,000	Final draft plan submitted within 1 year of license issuance for FERC approval

Table D-2. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the Deer-Creek Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2011 \$)	Annual-ized Capital Cost (2011 \$)	Annual O&M Cost (2011 \$)	Annual Energy Costs (2011 \$)	Total Annualized Cost (2011\$)	Comments
Implement Visual Resource Management Plan on Federal Land	Forest Service (4e #42); BLM (4e #20)	Adopt with staff modification	\$0	\$0	\$3,000	\$0	\$3,000	Final draft plan submitted within 1 year of license issuance for FERC approval
Total Applicant's Proposal			\$1,552,000	\$295,000	\$201,000	\$19,000	\$515,000	
Staff Alternative			\$1,552,000	\$295,000	\$202,000	\$19,000	\$516,000	
Staff Alternative with 4(e) Mandatory Conditions			\$1,552,000	\$295,000	\$203,000	\$19,000	\$517,000	

Appendix E

Capital and Annual Costs of Measures for the Yuba-Bear Project

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Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Annual Consultation with Forest Service and BLM	NID (YB-GEN1); Forest Service (4e #1); BLM (4e #42); California Fish and Wildlife (10j #1)	Adopt	\$0	\$0	\$15,000	\$0	\$15,000	
Employee Training	NID (YB-GEN2); Forest Service (4e #28); BLM (4e #1); California Fish and Wildlife (10j #1.1)	Adopt	\$0	\$0	\$20,000	\$0	\$20,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land	NID (YB-GEN3)	Do not adopt	\$0	\$0	\$16,000	\$0	\$16,000	
Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land	Forest Service (4e #34); BLM (4e #21); California Fish and Wildlife (10j #7.7)	Adopt	\$0	\$0	\$16,000	\$0	\$16,000	
Consultation Regarding New Ground Disturbing Activities on Federal Land	NID (YB-GEN4)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Consultation Regarding New Facilities on Federal Land	NID (YB-GEN5)	Do not adopt	\$0	\$0	\$3,000	\$0	\$3,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recom-mend?	Capital Cost (2010 \$)	Annual-ized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Development and Implementation of Coordinated Operations Plan for Yuba-Bear Hydroelectric Project and Drum-Spaulding Project	NID (YB-GEN6); Forest Service (4e #28); BLM (4e #2); California Fish and Wildlife (10j #1.2)	Adopt	\$60,000	\$4,000	\$0	\$0	\$4,000	
Pesticide and Herbicide Use Restrictions on Federal Land	NID (YB-GEN7)	Do not adopt	\$0	\$0	\$0	\$0	\$0	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Pesticide and Herbicide Use Restrictions on Federal Land	Forest Service (4e #16); BLM (4e #56); California Fish and Wildlife (10j #16)	Adopt	\$0	\$0	\$0	\$0	\$0	
Development and Implementation of Rollins Upgrade Construction Erosion Control and Restoration Plan ¹	NID (YB-G&S1)	Adopt	\$30,000	\$2,000	\$0	\$0	\$2,000	

¹ As part of its Amended Application, NID proposes to construct the Rollins no. 2 powerhouse adjacent to the existing Rollins powerhouse. Although the proposed powerhouse is included in NID's proposal, we have analyzed the costs and benefits of this project separately, so that the feasibility of the powerhouse construction project can be more accurately assessed. The cost associated with this PM&E measure is directly associated with the Rollins no. 2 powerhouse, and was analyzed separately from the Yuba-Bear Project in section 4.3.4.

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Development and Implementation of Recreation Facilities Construction Erosion Control and Restoration Plan	NID (YB-G&S2)	Do not adopt	\$90,000	\$6,000	\$0	\$0	\$6,000	
Implement Clear and Trap Creeks Stabilization Plans	NID (YB-G&S3); California Fish and Wildlife (10j #7.10)	Adopt	\$3,000,000	\$186,000	\$25,000	\$0	\$211,000	
Implement Erosion Control and Slope Maintenance Plan; Erosion and Sediment Control and Management; Slope Assessment and Facility Release Access Plan/Slope Stability Plan	NID (no measure #); Forest Service (4e #26 and #27); BLM (4e #25 and #41); California Fish and Wildlife (10j #22 and #27)	Adopt	\$2,750,000	\$170,000	\$180,000	\$0	\$350,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recom-mend?	Capital Cost (2010 \$)	Annual-ized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Watershed Restoration Plan	California Fish and Wildlife (10j #28)	Do not adopt	\$500,000	\$31,000	\$70,000	\$0	\$101,000	
Penstock and Other Drainage Structure Emergency and Maintenance Release Points	California Fish and Wildlife (10j #11)	Adopt with modification	\$20,000	\$1,000	\$5,000	\$0	\$6,000	
Development and Implementation of Rollins Upgrade Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan	NID (YB-WR1)	Adopt with modification	\$30,000	\$2,000	\$0	\$0	\$2,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Development and Implementation of Recreation Facilities Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan	NID (YB-WR2)	Adopt with modification	\$30,000	\$2,000	\$0	\$0	\$2,000	
Streamflows	--	--	--	--	--	--	--	
Part 1. Water Year Types	NID (YB-AQR1)	Adopt	\$0	\$0	\$1,000	\$0	\$1,000	
Part 2. Minimum Streamflows	NID (YB-AQR1)	Adopt	\$35,000	\$2,000	\$24,000	\$0	\$26,000	
Part 3. Bowman-Spaulding Diversion Conduit Outages and Drum-Spaulding Project's Drum Canal Outages	NID (YB-AQR1)	Adopt	\$90,000	\$6,000	\$0	\$0	\$6,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Part 4. Milton Diversion Dam, Bowman-Spaulding Diversion Dam and Rollins Dam Overwintering Minimum Streamflow Adjustments	NID (YB-AQR1)	Adopt	\$0	\$0	\$0	\$0	\$0	
Part 5. Wilson Creek Diversion Dam Flow Setting	NID (YB-AQR1)	Adopt	\$0	\$0	\$0	\$0	\$0	
Part 6. Chicago Park Powerhouse Motoring	NID (YB-AQR1)	Adopt	\$0	\$0	\$1,000	\$0	\$1,000	
Part 7. Milton Diversion Dam, Bowman-Spaulding Diversion Dam and Dutch Flat Diversion Dam Spill Cessation Schedules	NID (YB-AQR1)	Adopt	\$0	\$0	\$20,000	\$0	\$20,000	
Part 8. Rollins Reservoir Elevation Control	NID (YB-AQR1)	Adopt	\$0	\$0	\$2,000	\$0	\$2,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Streamflows; Parts 1 through 8 as detailed above	Forest Service (4e #29); Forest Service (10a #1-6); BLM (4e #3-8); California Fish and Wildlife (10j #2.1-#2.7, 2.9)	Adopt	\$90,000	\$6,000	\$48,000	\$0	\$57,000	
Minimum flows below Milton Diversion Dam	NMFS (10j #3.1)	Do not adopt	\$600,000	\$37,000	\$8,000	\$0	\$45,000	
Minimum flows below Bowman Lake and Lake Spaulding to manage water temperature	NMFS (10j #4.1)	Do not adopt	\$1,000,000	\$62,000	\$10,000	\$0	\$72,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recom-mend?	Capital Cost (2010 \$)	Annual-ized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Minimum flows below Milton Diversion Dam if steelhead are introduced in the absence of Chinook salmon	NMFS (10j #5.1)	Do not adopt	\$500,000	\$31,000	\$8,000	\$0	\$39,000	
Minimum flows below Bowman Lake and Lake Spaulding to manage water temperature for steelhead in the absence of Chinook salmon	NMFS (10j #6.1)	Do not adopt	\$1,000,000	\$62,000	\$10,000	\$0	\$72,000	
Fish Stocking in Bowman Lake	NID (YB-AQR2)	Do not adopt	\$0	\$0	\$75,000	\$0	\$75,000	
Fish Stocking in Rollins Reservoir	NID (YB-AQR3)	Do not adopt	\$0	\$0	\$40,000	\$0	\$40,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Reservoir fish stocking/Fish Stocking Plan	Forest Service (10a #9); California Fish and Wildlife (10j #17)	Adopt with modifications	\$10,000	\$1,000	\$230,000	\$0	\$231,000	
Steephollow Creek Foothill-Yellow Legged Frog Monitoring	NID (YB-AQR4); Forest Service (4e 10a #8); BLM (4e #10); California Fish and Wildlife (10j #2.11);	Adopt	\$174,000	\$11,000	\$6,000	\$0	\$17,000	
Implement Canal Fish Rescue Plan	NID (YB-AQR5)	Adopt	\$0	\$0	\$50,000	\$0	\$50,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Implement Canal Fish Rescue Plan	Forest Service (4e #30); BLM (4e #11); California Fish and Wildlife (10j #3)	Adopt	\$25,000	\$2,000	\$50,000	\$0	\$52,000	
Milton-Bowman Conduit Fish Entrainment	NID (YB-AQR6)	Do not adopt	\$1,200,000	\$74,000	\$0	\$0	\$74,000	
Milton-Bowman Conduit Fish Entrainment	Forest Service (4e #29); California Fish and Wildlife (10j #2.12)	Adopt	\$2,500,000	\$155,000	\$90,000	\$0	\$245,000	
Large Woody Material Management	Forest Service (4e #36); Forest Service (10a #7)	Adopt with modification	\$300,000	\$19,000	\$55,000	\$0	\$74,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Large Woody Material Management	California Fish and Wildlife (10j #2.10 and #9)	Adopt	\$300,000	\$19,000	\$45,000	\$0	\$64,000	
Rollins Dam Large Woody Material Management	NID (YB-AQR7)	Do not adopt	\$0	\$0	\$2,000	\$0	\$2,000	
Rollins Dam Large Woody Material Management; Dutch Flat Afterbay Large Woody Material Management	BLM (4e #9, #24)	Adopt	\$300,000	\$19,000	\$45,000	\$0	\$64,000	
Large Woody Material Management Plan	NMFS (10j #4.2.1 and #4.2.2)	Do not adopt	\$310,000	\$19,000	\$55,000	\$0	\$74,000	
Fall Creek Diversion Dam Minimum Streamflows	NID (YB-AQR8)	Do not adopt	\$0	\$0	\$3,000	\$0	\$3,000	
Fall Creek Diversion Dam Minimum Streamflows	Forest Service (4e #29)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Minimum Streamflows Compliance Measurement	NID (YB-AQR9); Forest Service (4e #31); BLM (4e #13); California Fish and Wildlife (10j #4)	Adopt	\$1,350,000	\$85,000	\$10,000	\$0	\$95,000	
Ecological Group	Forest Service (4e #29); BLM (4e #12); California Fish and Wildlife (10j #2.13)	Do not adopt	\$85,000	\$5,000	\$45,000	\$0	\$50,000	
MYR Supplemental Flow Release for Water Temperature Management w/ Water Temp Operations Group	California Fish and Wildlife (10j #2.8)	Do not adopt	\$185,000	\$11,000	\$70,000	\$0	\$81,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Aquatic Invasive Species Management	NID (no measure #)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Aquatic Invasive Species Management	Forest Service (4e #33); BLM (4e #15); California Fish and Wildlife (10j #6)	Adopt	\$25,000	\$2,000	\$5,000	\$0	\$7,000	
Implement Aquatic Monitoring Plan	NID (no measure #);	Adopt with staff modification	\$85,000	\$5,000	\$75,000	\$0	\$80,000	
Monitoring Program	Forest Service (4e #35); BLM (4e #23); California Fish and Wildlife (10j #8)	Do not adopt	\$185,000	\$86,000	\$150,000	\$0	\$236,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Annual Review of Ecological Conditions	California Fish and Wildlife (10j #10)	Do not adopt	\$0	\$0	\$15,000	\$0	\$15,000	
Implement Non-native Invasive Plant Management Plan	NID (YB-TR1); Forest Service (4e #34); BLM (4e #16); California Fish and Wildlife (10j #7.1)	Adopt	\$125,000	\$8,000	\$35,000	\$0	\$43,000	
Implement Vegetation Management Plan	NID (YB-TR2) ; Forest Service (4e #34); BLM (4e #16 and #32); California Fish and Wildlife (10j #7.1);	Adopt	\$125,000	\$8,000	\$40,000	\$0	\$48,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Bowman-Spaulding Transmission Line Avian Protection (Includes Forest Service Subconditions for Project Powerlines and Raptor Collisions)	NID (YB-TR3); Forest Service (4e #34)	Adopt	\$0	\$0	\$4,000	\$0	\$4,000	
Bowman-Spaulding Transmission Line Avian Protection	California Fish and Wildlife (10j #7.8)	Do not adopt	\$50,000	\$3,000	\$4,000	\$0	\$7,000	
Consult when Replacing Canal Wildlife Escape Facilities and Wildlife Crossing Facilities	NID (YB-TR4); Forest Service (4e #34); BLM (4e #18); California Fish and Wildlife (10j #7.3)	Adopt	\$0	\$0	\$1,000	\$0	\$1,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Monitor Animal Losses in Project Canals	NID (YB-TR5); Forest Service (4e #34); BLM (4e #17); California Fish and Wildlife (10j #7.2)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	
Bat Management	NID (YB-TR6); Forest Service (4e #34); BLM (4e #22); California Fish and Wildlife (10j #7.9)	Adopt	\$0	\$0	\$3,000	\$0	\$3,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Implement Bald Eagle Management Plan	NID (YB-TR7) Forest Service (4e #34); BLM (4e #19); California Fish and Wildlife (10j #7.5)	Adopt	\$20,000	\$1,000	\$4,000	\$0	\$5,000	
Eradicate Bullfrogs	FWS (10a #2)	Do not adopt	\$0	\$0	\$0	\$0	\$0	
Wildlife Protection	FWS (10a #3)	Do not adopt	\$0	\$0	\$0	\$0	\$0	
Ecological Group and Annual Review of Ecological Conditions	Forest Service (4e #29); BLM (4e #12)	Do not adopt	\$0	\$0	\$15,000	\$0	\$15,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Protection of Special Status Species	Forest Service (4e #12 and #34); BLM (4e #20 and #52); California Fish and Wildlife (10j #7.6 and #12)	Do not adopt	\$0	\$0	\$0	\$0	\$0	
Protect and Maintain Natural Ecosystem Processes	FWS (10a #5)	Do not adopt	\$0	\$0	\$0	\$0	\$0	
Wildlife Crossing in Bowman-Spaulding Canal	Forest Service (4e #34)	Adopt	\$30,000	\$2,000	\$20,000	\$0	\$22,000	
Wildlife Crossing in Bowman-Spaulding Canal	California Fish and Wildlife (10j #7.4)	Do not adopt	\$45,000	\$3,000	\$20,000	\$0	\$23,000	
Implement NID Proposed Recreation Plan	NID (YB-RR1)	Adopt with modifications	\$32,524,000	\$2,013,000	\$915,000	\$0	\$2,928,000	Costs for individual plan components are itemized below

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Implement Agency (Forest Service, California Fish and Wildlife, BLM) Recommended Recreation Plan	Forest Service (4e #41); BLM (4e #26, #31 and # 36); California Fish and Wildlife (10j #16)	Adopt with modifications	\$14,260,000	\$878,000	\$246,000	\$0	\$1,124,000	Costs for individual plan component are itemized below.
Recreation Plan: East Meadow Campground	NID (YB-RR1)	Do not adopt	\$2,087,000	\$129,000	\$4,000	\$0	\$133,000	
East Meadow Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$2,145,000	\$133,000	\$5,000	\$0	\$138,000	
Recreation Plan: Pass Creek Campground	NID (YB-RR1)	Do not adopt	\$1,598,000	\$99,000	\$4,000	\$0	\$103,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Pass Creek Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$1,600,000	\$99,000	\$5,000	\$0	\$104,000	
Recreation Plan: Pass Creek Overflow Campground	NID (YB-RR1)	Adopt with modification	\$371,000	\$23,000	\$4,000	\$0	\$27,000	
Pass Creek Overflow Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$371,000	\$17,000	\$5,000	\$0	\$22,000	
Recreation Plan: Pass Creek Boat Launch	NID (YB-RR1)	Adopt with modification	\$1,818,000	\$113,000	\$4,000	\$0	\$117,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Aspen Group Campground	NID (YB-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$867,000	\$54,000	\$4,000	\$0	\$58,000	
Recreation Plan: Aspen Picnic Area	NID (YB-RR1)	Do not adopt	\$457,000	\$28,000	\$4,000	\$0	\$32,000	
Aspen Picnic Area	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$490,000	\$30,000	\$4,000	\$0	\$34,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Jackson Meadows Group Campground (proposed)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
Jackson Meadows Family Campground (proposed)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
Recreation Plan: Jackson Meadows Dump Station	NID (YB-RR1)	Adopt	\$200,000	\$12,000	\$4,000	\$0	\$16,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Jackson Meadows Dump Station	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$180,000	\$11,000	\$4,000	\$0	\$15,000	
Recreation Plan: Jackson Meadows Vista	NID (YB-RR1) ; Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$86,000	\$5,000	\$4,000	\$0	\$9,000	
Recreation Plan: Findley Campground	NID (YB-RR1)	Do not adopt	\$727,000	\$45,000	\$4,000	\$0	\$49,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Findley Campground	Forest Service (4e #41) ; California Fish and Wildlife (10j #16)	Adopt	\$737,000	\$46,000	\$4,000	\$0	\$50,000	
Recreation Plan: Fir Top Campground	NID (YB-RR1)	Do not adopt	\$564,000	\$35,000	\$4,000	\$0	\$39,000	
Fir Top Campground	Forest Service (4e #41k); California Fish and Wildlife (10j #16)	Adopt with modification	\$579,000	\$36,000	\$4,000	\$0	\$40,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Silvertip Group Campground	NID (YB-RR1) ; Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$396,000	\$25,000	\$4,000	\$0	\$29,000	
Recreation Plan: Woodcamp Campground	NID (YB-RR1)	Do not adopt	\$976,000	\$60,000	\$4,000	\$0	\$64,000	
Woodcamp Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$991,000	\$61,000	\$4,000	\$0	\$65,000	
Recreation Plan: Woodcamp Picnic Area	NID (YB-RR1)	Do not adopt	\$949,000	\$59,000	\$4,000	\$0	\$63,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Woodcamp Picnic Area	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$995,000	\$62,000	\$4,000	\$0	\$66,000	
Recreation Plan: Woodcamp Boat Launch	NID (YB-RR1)	Do not adopt	\$1,006,000	\$62,000	\$4,000	\$0	\$66,000	
Woodcamp Boat Launch	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$1,021,000	\$63,000	\$4,000	\$0	\$67,000	
Recreation Plan: Woodcamp Complex-Road & Trails	NID (YB-RR1)	Adopt with modification	\$1,404,000	\$87,000	\$4,000	\$0	\$91,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Woodcamp Complex Interpretive Trail (improvements that include interpretive trail)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$15,000	\$1,000	\$1,000	\$0	\$2,000	
Additional Jackson Meadows Area Trails	Forest Service (4e #41s); California Fish and Wildlife (10j #16)	Adopt with modification	No cost estimate provided		No cost estimate provided			
Recreation Plan: Jackson Point Boat-In Campground	NID (YB-RR1)	Do not adopt	\$99,000	\$6,000	\$4,000	\$0	\$10,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Jackson Point Boat-In Campground	Forest Service (4e #41) ; California Fish and Wildlife (10j #16)	Adopt	\$120,000	\$7,000	\$4,000	\$0	\$11,000	
Recreation Plan: Jackson Meadows Administrative Sites	NID (YB-RR1) ; Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$30,000	\$2,000	\$0	\$0	\$2,000	
Jackson Meadows Development Plan	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Milton Diversion Impoundment Day Use Area & Hand Launch (proposed)	NID (YB-RR1)	Do not adopt	\$173,000	\$11,000	\$8,000	\$0	\$19,000	
Recreation Plan: Milton Diversion Impoundment Designated Primitive Campsites	NID (YB-RR1)	Do not adopt	\$114,000	\$7,000	\$8,000	\$0	\$15,000	
Milton Diversion Impoundment Area	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$287,000	\$18,000	\$16,000	\$0	\$34,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Jackson Creek Campground	Forest Service (4e #41); California Fish and wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
French Lake (parking area improvements, barriers, and trailhead)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	No cost estimate provided		No cost estimate provided			
Recreation Plan: Bowman Lake Campground (and informal boat ramp)	NID (YB RR-1)	Adopt	\$154,000	\$8,000	\$6,000	\$0	\$14,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Bowman Lake Campground (includes expanding by 20 campsites)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$194,000	\$12,000	\$10,000	\$0	\$22,000	
Recreation Plan: Bowman Lake Designated Primitive Campsites (proposed)	NID (YB-RR1)	Adopt	\$270,000	\$17,000	\$6,000	\$0	\$23,000	
Bowman Lake Primitive Campsites (remove)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Bowman Lake Day Use Areas (proposed)	NID (YB-RR1), Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$217,000	\$13,000	\$6,000	\$0	\$19,000	
Bowman Reservoir Area-Recreation Corridor Plan	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$25,000	\$2,000	\$4,000	\$0	\$6,000	
Other Trails Bowman Recreation Corridor	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Sawmill Family Campground (proposed)	NID (YB-RR1)	Adopt	\$619,000	\$38,000	\$8,000	\$0	\$46,000	
Sawmill Family Campground (proposed)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$770,000	\$48,000	\$10,000	\$0	\$58,000	
Recreation Plan: Sawmill Group Campground (proposed)	NID (YB-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$435,000	\$27,000	\$8,000	\$0	\$35,000	
Recreation Plan: Sawmill Lake Dam Day Use Area	NID (YB-RR1)	Adopt	\$76,000	\$5,000	\$8,000	\$0	\$13,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Canyon Creek Campground	NID (YB-RR1)	Do not adopt	\$565,000	\$35,000	\$7,000	\$0	\$42,000	
Canyon Creek Campground	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$847,000	\$52,000	\$10,000	\$0	\$62,000	
Canyon Creek Dispersed Sites	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Faucherie Lake Group Campground	NID (YB-RR1); Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$160,000	\$10,000	\$6,000	\$0	\$16,000	
Recreation Plan: Faucherie Lake Day Use and Boat Launch	NID (YB-RR1)	Adopt	\$383,000	\$24,000	\$6,000	\$0	\$30,000	
Faucherie Lake Day Use and Boat Launch	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	\$433,000	\$27,000	\$10,000	\$0	\$37,000	
Recreation Plan: Faucherie Lake Dam Parking Area	NID (YB-RR1)	Do not adopt	\$5,000	\$0	\$0	\$0	\$0	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Faucherie Lake Dam Parking Area	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt	\$10,000	\$1,000	\$0	\$0	\$1,000	
Recreation Plan: Dutch Flat Afterbay Day Use Area (proposed)	NID (YB-RR1); California Fish and Wildlife (10j #16); BLM (4e #33)	Adopt	\$259,000	\$16,000	\$7,000	\$0	\$23,000	
Langs Crossings	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Bear River Trail Project	Forest Service (4e #41); BLM (10a #1); California Fish and Wildlife (10j #16)	Do not adopt	No cost estimate provided		No cost estimate provided			
Recreation Plan: Rollins Orchard Springs Recreation Complex ²	NID (YB-RR1)	Adopt	\$3,910,000	\$242,000	\$22,000	\$0	\$264,000	
Recreation Plan: Rollins Greenhorn Recreation Complex ³	NID (YB-RR1)	Adopt	\$2,502,000	\$155,000	\$22,000	\$0	\$177,000	

² Cost estimates provided by NID and no recommendation or improvements were provided in the Recreation Plan

³ Cost estimates provided by NID and no recommendation or improvements were provided in the Recreation Plan

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Plan: Rollins Peninsula Recreation Complex ⁴	NID (YB-RR1)	Adopt	\$4,628,000	\$287,000	\$277,000	\$0	\$564,000	
Recreation Plan: Rollins Long Ravine Recreation Complex ⁵	NID (YB-RR1)	Adopt	\$4,344,000	\$269,000	\$277,000	\$0	\$546,000	
Recreation Survey, Monitoring, and Future Development Triggers	Forest Service (4e #37); BLM (4e #30); California Fish and Wildlife (10j #12)	Adopt	\$0	\$0	\$20,000	\$0	\$20,000	
Licensee Contact	Forest Service (4e #38); BLM (4e #27)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	

⁴ Cost estimates provided by NID and no recommendation or improvements were provided in the Recreation Plan

⁵ Cost estimates provided by NID and no recommendation or improvements were provided in the Recreation Plan

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Review of Recreation Developments	Forest Service (4e #39); BLM (4e #29); California Fish and Wildlife (10a #14)	Adopt	\$0	\$0	\$10,000	\$0	\$10,000	
Annual Recreation Coordination Meeting	Forest Service (4e #40); BLM (4e #28); California Fish and Wildlife (10j #15)	Adopt	\$0	\$0	\$6,000	\$0	\$6,000	
Provide Potable Water (15 service connections or 25 persons)	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$50,000	\$3,000	\$120,000	\$0	\$123,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Food Lockers	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$12,000	\$1,000	\$0	\$0	\$1,000	
Public Information and Education	Forest Service (4e #41); California Fish and Wildlife (10j #16)	Adopt with modification	\$10,000	\$1,000	\$3,000	\$0	\$4,000	
Plan addressing Costs of Managing Project-Related Recreation	Forest Service (4e #41); BLM (4e #37); California Fish and Wildlife (10j #16)	Adopt	\$8,000	\$0	\$0	\$0	\$0	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recom-mend?	Capital Cost (2010 \$)	Annual-ized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Recreation Operation, Maintenance, and Administration Agreement	BLM (4e #35)	Adopt	\$0	\$0	\$30,000	\$0	\$30,000	
Chicago Park Power House and Connecting Facilities and Roads	BLM (4e #34)	Adopt with modification	\$0	\$0	\$50,000	\$0	\$50,000	
Provide Recreation Flow Information	NID (YB-RR2)	Adopt	\$0	\$0	\$4,000	\$0	\$4,000	
French Dam Supplemental Flows for Whitewater Boating	NID (YB-RR3)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Milton Diversion Dam Supplemental Flows for Whitewater Boating	NID (YB-RR4)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	
Bowman-Spaulding Diversion Dam Supplemental Flows for Whitewater Boating	NID (YB-RR5)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Implement Transportation Plan on Federal Land	NID (YB-LU #1); Forest Service (4e #44); BLM (4e #39); California Fish and Wildlife (10a #20)	Adopt	\$835,000	\$52,000	\$90,000	\$0	\$142,000	
Implement Fire Prevention and Response Plan on Federal Land	NID (YB-LU #2); Forest Service (4e #45); BLM (4e #40); California Fish and Wildlife (10a #21)	Adopt	\$30,000	\$2,000	\$2,000	\$0	\$4,000	
Project Boundary revision	NID (no measure #)	Adopt	\$50,000	\$3,000	\$0	\$0	\$3,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommendation?	Capital Cost (2010 \$)	Annualized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Implement Historic Properties Management Plan	NID (YB-CR1); Forest Service (4e #43); BLM (4e #38); California Fish and Wildlife (10a #19)	Do not adopt	\$1,650,000	\$102,000	\$14,000	\$0	\$116,000	Implement within 1 year of license issuance
Implement Historic Properties Management Plan	Staff	Adopt	\$1,650,000	\$102,000	\$14,000	\$0	\$116,000	Implement upon license issuance
Implement Visual Resource Management Plan	NID (YB-AER #1); Forest Service (4e #42); California Fish and Wildlife (10a #18)	Adopt	\$0	\$0	\$5,000	\$0	\$5,000	

Table E-1. Estimated capital and O&M costs of measures proposed by NID and recommended by staff and agencies for the Yuba-Bear Project. (Source: Staff)

Measure	Entity and Measure No.	Staff Recommend?	Capital Cost (2010 \$)	Annual-ized Capital Cost (2010 \$)	Annual O&M Cost (2010 \$)	Annual Energy Costs (2010 \$)	Total Annualized Cost (2010 \$)	Comments
Hazardous Substances Plan	Forest Service (4e #23); California Fish and Wildlife (10j #23)	Adopt	\$60,000	\$4,000	\$0	\$0	\$4,000	
Total Applicant's Proposal			\$41,260,000	\$2,556,000	\$1,282,000	\$2,280,000	\$3,838,000	
Staff Alternative			\$46,875,000	\$2,910,000	\$2,329,000	\$2,280,000	\$5,239,000	
Staff Alternative with 4(e) Mandatory Conditions			\$47,476,000	\$2,941,000	\$2,490,000	\$2,280,000	\$5,431,000	

Appendix F

Draft License Articles: Drum-Spaulding Project

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DRAFT LICENSE ARTICLES: DRUM-SPAULDING PROJECT

I. MANDATORY CONDITIONS

On August 23, 2012, the U.S. Department of Agriculture, Forest Service (Forest Service) filed 46 4(e) conditions (described in section 2.2.4.1 of the environmental impact statement [EIS] and included in appendix H-1). We consider 23 of these conditions (2 through 11, 13 through 15, 17 through 22, 24, 25, 32, and 46) to be administrative or legal in nature and not specific environmental measures. Of the 23 conditions we consider to be environmental measures, we include 18¹ of these conditions in the staff alternative as specified by the Forest Service. We recognize, however, that the Federal Energy Regulatory Commission (Commission) is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.1.2, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with the Forest Service's corresponding conditions, as filed with the Commission.

On August 23, 2012, the U.S. Department of the Interior, Bureau of Land Management (BLM) filed 50 4(e) conditions (described in section 2.2.4.1 of the EIS and included in appendix H-2). We consider 23 of these conditions (8, 24 through 32, 34, 35, 36, and 38 through 47) to be administrative or legal in nature and not specific environmental measures. Of the 27 conditions we consider to be environmental measures, we include 22² of these condition in the staff alternative as specified by BLM. We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.1.2, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with BLM's corresponding conditions, as filed with the Commission.

On July 31, 2012, the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) filed 15 4(e) conditions (described in section 2.2.4.1 of the EIS and included in appendix H-3). We consider 11 of these conditions (A, b.2 through b.8, b.12, b.13, and b.14) to be administrative or legal in nature and not specific environmental measures. Of the four

¹ As explained in section 5 of the EIS, we recommend modifying the following conditions specified by the Forest Service: (1) Flow Measures (aspects of condition 29); (2) Terrestrial Protective Measures (aspects of condition 34); (3) Monitoring Program (condition 35); (4) Large Woody Debris Management Plan (condition 36); (5) Recreation Plan (condition 41); and (6) Historic Properties Management Plan (condition no. 43). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 12/34).

² As explained in section 5 of the EIS, we recommend modifying the following conditions specified by BLM: (1) Ecological Group (condition 7); (2) Wildlife Crossings – Bear River and Drum (Chalk Bluff) Canals (condition 10); and (3) Historic Properties Management Plan (condition 21). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 13/33).

conditions we consider to be environmental measures, we include three³ of these conditions in the staff alternative as specified by Reclamation. We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.1.2, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with Reclamation's corresponding conditions, as filed with the Commission.

II. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project in addition to the mandatory conditions.

Draft Article 4XX. *Commission Approval, Notification, and Filing of Amendments.*

(a) *Requirement to File Plans for Commission Approval*

Various mandatory conditions specified by the Forest Service and Bureau of Land Management (BLM) under section 4(e) require Pacific Gas & Electric (PG&E) to prepare plans in consultation with other entities for approval by the Forest Service and BLM; some of these measures do not specify that Commission approval is required prior to implementation. Each such plan shall also be submitted to the Commission for approval. These plans are listed below.

Forest Service condition	Plan name	Due date
23	Oil And Hazardous Substances Storage And Spill Prevention And Cleanup Plan	Within 1 year of license issuance
26	Slope Assessment and Facility Release Access Plan	Within 1 year of license issuance
27	Erosion and Sediment Control Management Plan	Within 1 year of license issuance
28	Coordinated Operations Plan	Within 90 days of license issuance
30	Canal Outages Fish Rescue Plan	Not specified
31	Gaging Plan	Not specified
33	Aquatic Invasive Species Management Plan	Within 1 year of license issuance
34	Vegetation and Non-Native Invasive Plant Management Plan	Within 1 year of license issuance
34	Wildlife Crossing Plan for Drum, South Yuba, and Towle canals	Within 1 year of license issuance

³ As explained in section 5 of the EIS, we recommend modifying the following condition specified by Reclamation: Discovery of Cultural Resources (condition b.11).

Forest Service condition	Plan name	Due date
34	Wildlife Crossing Plan for Bear and South canals	Within 1 year of license issuance
34	Bald Eagle Management Plan	Not specified
34	Bear River Management Plan	Within 1 year of license issuance
35	Final study plans for each element of the Monitoring Program	Not specified
36	Large Woody Debris Management Plan	Not specified
41	Recreation Plan	Within 1 year of license issuance
42	Visual Resource Management Plan	Not specified
43	Historic Properties Management Plan	Upon license issuance
44	Transportation System Management Plan	Within 1 year of license issuance
45	Fire Management and Response Plan	Within 1 year of license issuance
BLM condition	Plan name	Due date
2	Coordinated Operations Plan	Within 90 days of license issuance
5	Canal Outages Fish Rescue Plan	Not specified
9	Gaging Plan	Not specified
10	Wildlife Crossings Plan for the Bear and Drum and Chalk Bluff canals	Within 1 year of license issuance
16	Bald Eagle Management Plan	Not specified
17	Vegetation and Non-Native Invasive Plant Management Plan	Within 1 year of license issuance
18	Fire Management and Response Plan	Within 1 year of license issuance
19	Slope Assessment and Facility Release Point Plan	Within 1 year of license issuance
20	Visual Resource Management Plan	Not specified
21	Historic Properties Management Plan	Upon license issuance
22	Transportation System Management Plan	Within 1 year of license issuance
49	Hazardous Substances Plan	Within 1 year of license issuance
50	Erosion and Sediment Control and Management	Within 1 year of license issuance

(b) Requirement to File Reports

Some Forest Service and BLM section 4(e) conditions require PG&E to file reports with other entities. These reports document compliance with requirements of this license and may have a bearing on future actions. Each such report shall also be submitted to the Commission. These reports are listed in the following table.

Forest Service condition	Description	Due date
1	Reports documenting annual meetings with the Forest Service and other stakeholders	Within 60 days of the meeting
1	Reports documenting issues related to public safety and non-compliance	As soon as possible
29	Report documenting flow setting measures undertaken	Provide at annual consultation meeting
34	Recommendations and implementation schedule to reduce animal mortality in canal, if increasing mortality trend	Following direction from review at annual consultation meeting
34	Biological evaluation for special status species and their habitats for construction of new project features	Prior to construction action
34	Report summarizing monitoring of stream channel and riparian conditions in Bear River upstream of Drum afterbay	Annually following years of monitoring
35	Annual report describing monitoring efforts of previous calendar year	June 30, annually
35	5-Year summary monitoring report	Year 5, 10, 20, 30, etc.
37	6-year and 12-year Recreation Survey and Monitoring Reports	Not specified
BLM condition	Description	Due date
11	Recommendations and implementation schedule to reduce animal mortality in canal, if increasing mortality trend	Following direction from review at annual consultation meeting
13	Biological evaluation for special status species and their habitats for construction of new project features	Prior to construction action
23	Reports documenting annual meetings with BLM and other stakeholders	Within 60 days of the meeting
23	Reports documenting issues related to public safety and non-compliance	As soon as possible

(c) Requirement to Notify Commission of Planned and Unplanned Deviations from License Requirements

Certain Forest Service and BLM 4(e) conditions would allow PG&E to temporarily modify project operations under certain situations. The Commission shall be notified prior to implementing such modifications, if possible, or in the event of an emergency, as soon as possible, but no later than 10 days after each such incident.

Forest Service condition	License requirement
29	Temporary modification of minimum streamflows following consultation or due to an emergency
29	Notification of schedule or change of schedule for routine and non-routine planned canal outages affecting minimum streamflows; notification within 1 business day of emergency canal outage
29	Notification and consultation on minimum streamflows during canal outages lasting longer than 30 days

BLM condition	License requirement
4	Notification of schedule or change of schedule for routine and non-routine planned canal outages affecting minimum streamflows; notification within 1 business day of emergency canal outage
4	Notification and consultation on minimum streamflows during canal outages lasting longer than 30 days

(d) Requirement to File Amendment Applications

Certain Forest Service, BLM, and Bureau of Reclamation (Reclamation) conditions appear to contemplate these agencies requiring unspecified long-term changes to project operations or facilities based on new information or results of monitoring but do not appear to require Commission approval for such changes (e.g., modification of supplemental flows, anadromous fish introduction). Such changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license.

Draft Article 4XX. *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretaries of Interior or Commerce pursuant to section 18 of the Federal Power Act.

Draft Article 4XX. *Jordan Creek Diversion Decommissioning Plan.* Within 1 year of license issuance, the licensee shall prepare a plan to decommission the Jordan Creek diversion dam, Jordan Creek canal, and other appurtenant structures. The plan shall: (1) detail the most appropriate measures to disable, deconstruct, and abandon in place all components of the diversion system; (2) provide a schedule for completion of decommissioning tasks; (3) identify all permits required; and (4) estimate costs for completion of the work. Proposed measures shall take into consideration public safety during and following decommissioning. The plan shall

include site-specific erosion control and sediment management and site health and safety plans. The plan shall identify potential environmental effects associated with decommissioning activities and measures that will be implemented to minimize, mitigate, and restore environmental impacts on aquatic and terrestrial resources including, if necessary, channel and bank stability and management of sediment trapped in the diversion dam impoundment.

The decommissioning plan shall be developed after consultation with the Forest Service and the California Department of Fish and Wildlife (California Fish and Wildlife). The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project- specific reasons.

The Commission reserves the right to require changes to the plan. Land-disturbing activities associated with the decommissioning shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Bear River Management Upstream of Forest Service Lands.

Winter Operating Plan Spills at Drum Canal

Winter operational spills typically occur between November and May. During winter operations, the licensee shall make a good faith effort to:

- Limit operational flow release from Drum canal at YB-137 to no greater than 200 cubic feet per second (cfs), not including natural flow, calculated at Bear River at Highway 20 (YB-198).
- Implement a ramping rate for both increases and decreases, of 0.40 feet per hour as measured at the existing stream gage Bear River at Highway 20 (YB-198).
- Limit water that is spilled into the Bear River from Drum canal when Drum afterbay is forecast to spill and Dutch Flat No. 1 and No. 2 powerhouses are fully loaded.
- Except in an emergency or other project outages, limit flows into the Bear River that, when combined with accretion flows, are limited to 500 cfs as measured at the existing stream gage Bear River near Highway 20 (YB-198)

Planned Outage Spills at Drum Canal

During outages of facilities (e.g., Drum canal, Drum 1 or 2 powerhouses), when Drum canal cannot be operated at full capacity for conveyance, the licensee shall, to the extent reasonably possible:

- Distribute water spilled from the Drum canal between Bear River Spill (YB-137, RM 35.3 on the Bear River), Bear Valley Spill (RM 33.6), and Tahoe Spill (RM 31.75) to reduce the magnitude of flows through the Bear Valley Meadow (upper end of Bear River Reach #2).

- Implement a 2-day ramping rate when decreasing flows into the Bear River Reaches #1 and #2 from the Bear River Spill (YB-137), Bear Valley Spill, and Tahoe Spill – spills shall be adjusted at each location, at a rate not to exceed 50 cfs over a 6 hour period.
- Notify the agencies that participate in the Annual Meeting (Condition No. 1), either at the Annual Meeting or as soon as reasonably practicable when Bear River Reach #1 or #2 were needed to convey water.

Emergencies

The operational guidelines in this measure do not apply in emergencies. An emergency is defined as an event that is reasonably out of the control of the licensee and requires the licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life, damage to property, loss of project facilities, or water supply delivery infrastructure. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. During emergencies any Drum Canal spillway may be used without restriction.

Water Supply Protection

The licensee may exceed the good faith flow limits described in this measure or utilize project spillways during planned or unplanned outages to the extent needed to avoid limiting downstream consumptive water deliveries.

Channel Morphology and Riparian Vegetation Assessment in the Vicinity of Bear Valley

By no later than the first full water year after license issuance, the licensee shall perform an assessment during the July to August period to establish a new baseline for conditions in the vicinity of the Bear Valley. Based on this baseline, the licensee shall evaluate changes in riparian vegetation and channel stability in the portion of Bear River Reach #2 that runs through Bear Valley, an approximately 2.3-mile portion located between RM 35.0 (upstream end) to RM 32.7 (downstream end) according to the schedule of riparian and channel morphology assessments outlined in Table 1, below. The purpose shall be to determine if project waters that are released into the Bear River adversely affect channel morphology and riparian vegetation in the vicinity of the Bear Valley, including the Bear Valley Meadow and, if adverse effects are determined to occur, to develop specific protection actions.

This assessment shall include the following components:

Table 1. Riparian and channel morphology assessment periodicity for the Bear River Management Through Bear Valley Measure.

	By Year 1 / New Baseline	Annually, Years 2-4	Annually for Term of license	Year 5	Every 5 Years Beginning	Following Operational Flows Exceeding 250 cfs for a 24-hour period at gage YB- 198

Quantitative						
Longitudinal Profile	X			X		
Level Loggers	X					
Monumented Cross-sections	X			X	X	
Qualitative						
Photo Monitoring	X	X	X	X	X	X
Riparian Vegetation	X			X	X	
Bank Stability	X			X	X	
Walking Survey—Bear Valley (to identify erosional areas)	X	X	X	X	X	
Spill Channel Evaluation (to identify erosional areas)	X	X	X	X	X	

- Quantitative assessment:
 - Longitudinal profile – The licensee shall establish a longitudinal profile of the Bear River thalweg from RM 35.0 at the upstream end, to the bedrock control point at the downstream end of the meadow near RM 32.7 at the downstream (west) end of Bear Valley Meadow. The purpose of the longitudinal profile is to establish grade control locations throughout the Bear River in Bear Valley.
 - Install level loggers at three locations: Lower Meadow Channel Morphology Cross Section LM T2; Middle Meadow Channel Morphology Cross Section MM T5, and Upper Meadow Channel Morphology Cross Section UM T2 to compare against discharge as measured at YB-198. The purpose of the installation of the level loggers is to establish a stage-discharge relationship in the Bear Valley meadow so that if erosion does occur within the meadow, the discharge at which it occurred could be estimated from the stage—discharge relation at these three locations. One barometric level logger shall be placed at the Lower Meadow site to be able to adjust for air pressure effects on the level logger measurements.
 - Monumented Cross Section: The licensee and Forest Service shall collaboratively establish three monumented cross sections that are typical of the Bear River channel in the vicinity of Bear Valley. Profiles at each of these cross sections shall be taken on year 1, 5, 10 and every 5 years after year 10 to monitor changes in channel width and depth.
- Qualitative assessment:

- Photo Monitoring – The licensee shall establish photo monitoring points at benchmark locations so that any year-to-year changes shall be captured at recovering locations where channel processes appear to have stabilized historical disturbances, and at locations where channel processes are causing active erosion. The purpose of the photo monitoring is to visually track erosion and channel processes at specific locations over time.
- Riparian Vegetation and Bank Stability – The licensee shall perform a qualitative assessment of riparian vegetation and bank stability at cross sections that have been selected from existing channel morphology transects (established 2009) and reflect a variety of bank conditions. It is assumed that two to three long-term monitoring transects shall be selected from the existing population of transects in the Lower, Middle and Upper Meadow study sites. For the purpose of these assessments, riparian vegetation is defined as wetland indicator species as identified by Reed (National List of Plant Species that Occur in Wetlands: California, Region 0, 1988) or a similar reference. The purpose of the riparian vegetation and bank stability assessments is to track the recruitment and growth of vegetation and the development of the channel processes governing erosion, and determine whether any degradation of ecological resources is occurring at actively-eroding sites.
- Walking survey – The licensee shall perform an annual qualitative assessment of the meadow and identify any locations where active erosion causing degradation of riparian or instream resources could be reasonably prevented or addressed by the licensee through operational changes or remediation. Photos shall be taken at any new areas of concern.
- Spill channel evaluation – The licensee shall perform an annual qualitative assessment of three spill channels (if utilized during the previous calendar year): Bear River (RM 35.3), Bear Valley (RM 33.6) and Tahoe spills (RM 31.75). The purpose is to identify any locations where active erosion is occurring following spill flows.

Results of the annual assessment and any qualitative or quantitative monitoring from the prior water year shall be provided at the annual consultation meeting and filed with the Commission. Based on monitoring results and the annual assessments, the licensee shall work with appropriate agencies to identify and implement any collaboratively agreed upon remedial actions to address any new, adverse project-related effects such as:

- Vertical Bear River banks (locations where project-related bank erosion has caused vertical or slumped banks but tributary inflow has not caused development of a nick or headcut); remediation may include laying back the banks and establishing bank protection by covering with fabric and planting with sedges and willow cuttings.
- Nicks (locations where project-related bank erosion along the Bear River could develop into a headcut that could migrate into the meadow due to a combination of bank erosion and tributary drainage inflow); remediation may include sloping of the bank face of nicks that occur on the channel banks and establishment of toe protection by laying fabric and willow wattles to prevent further erosion.
- Headcuts (locations where project-related bank erosion combined with tributary drainage have developed into a gully and/or tributary that has a headcut that is actively migrating away from the Bear River mainstem and into the terrace/meadow surface); remediation may include filling the gullies that have been formed by headcuts migrating away from

the main Bear River channel, planting with willow and/or laying in fabric and rock to prevent further erosion and migration of the headcut.

The licensee shall file with the Commission documentation of remedial work conducted under this article.

The licensee shall consult with appropriate agencies and obtain necessary permits prior to undertaking the remediation activities. Any locations where the licensee has performed remediation efforts shall be monitored annually using photo points for five years subsequent to the remediation activities.

Draft Article 4XX. Vegetation and Non-Native Invasive Plant Management Plan. The Vegetation and Non-Native Invasive Plant Management Plan required by Forest Service condition 34 and BLM condition 17 shall also cover private lands and provide for protection of culturally important species to the tribes. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Fish Stocking Plan. Within 1 year of license issuance, the licensee shall file with the Commission for approval, a plan to evaluate and monitor the location, frequency, age, and number/weight of fish to be stocked in Lake Spaulding, Halsey forebay, Lake Valley reservoir, Fuller Lake, and Lower Lindsey Lake. The plan shall include provisions for periodic review of angling use levels, including fish stocking at additional reservoirs should the need arise based on the periodic review, and annual consultation California Fish and Wildlife, Forest Service, and U.S. Fish and Wildlife Service (FWS).

The Fish Stocking Plan shall be developed after consultation with California Fish and Wildlife, the Forest Service, and FWS. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Recreation Plan. The Recreation Plan required by Forest Service condition 41 shall also include the following:

- (1) Within two years, install animal-resistant food lockers at all campsites, including dispersed primitive campsites, at Blue Lake, Kidd Lake, and Peak Lake;
- (2) Within two years, install directional signs to Kelly Lake, to and from the Highway 20 junction to the Deer Creek Forebay, to and from the I-80 junction to the Drum forebay, and to and from the Alta Bonnynook Road/Baxter Road junction to the Alta forebay;
- (3) Within three years, repave the campground roads at Lake Spaulding Campground;
- (4) Within three years, install courtesy dock at boat ramp and expand the turnaround/existing parking to create trailer parking spaces at Fuller Lake;

(6) Within three years, replace vehicle barriers around the parking area, remove the two pit restrooms, and replace three picnic tables and remove two picnic tables at Kelly Lake Picnic area;

(7) Within three years, dismantle and restore recreation sites at Fordyce Lake;

(8) Within five years, rehabilitate existing Blue Lake Primitive Hike-in Campsites and construct a pedestrian, native surface trail within the campsite area;

(9) Within five years, install up to five additional picnic sites, including one accessible picnic unit, and extend the boat ramp to provide launching through Labor Day for all water year types, except critically dry, at Silvertip Picnic Area and Boat Launch;

(10) Within five years, install a parking area for up to five vehicles (one accessible), an information board, and fencing between the parking lot and adjacent private property at Wise Forebay;

(11) Within five years, upgrade the Halsey Forebay Picnic site adjacent to the accessible restroom to accessible standards with parking;

(12) Within 15 years, redesign and reconstruct Lower Lindsey Lake Campground as Development Scale 2; and

(13) An implementation schedule for all repairs, upgrades, and rehabilitation improvements to project recreation facility developments.

The plan filed with the Commission shall include documentation of consultation with the Forest Service, BLM, and California Fish & Wildlife; copies of recommendations on the completed plan after it has been prepared and provided to the entities above; and a specific description of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Recreation Flow Information. Within 1 year of license issuance, the licensee shall provide the public access, via its webpage on the internet, to daily average stream flow information on a year-round basis at five locations: (1) South Yuba River above Lake Spaulding at Cisco; (2) Fordyce Creek below Lake Fordyce; (3) South Yuba River below Lake Spaulding dam; (4) Bear River at Highway 20; and (5) Bear River below Drum afterbay.

Draft Article 4XX. Fire Prevention and Response Plan. The Fire Prevention and Response Plan required by Forest Service condition 45 and BLM condition 40 shall cover all lands within the project boundary and shall include a period of review and revision. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Hazardous Substances Plan. The Hazardous Substances Plan required by Forest Service condition 23 shall cover all project lands and BLM shall be consulted during the development of the plan. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Programmatic Agreement and Historic Properties Management Plan. The licensee shall implement the "Programmatic Agreement Between the Federal Energy Regulatory Commission and the State of California Historic Preservation Officer for Managing

Historic Properties that May be Affected by Issuing of a License to PG&E for the Drum-Spaulding Hydroelectric Project in Placer and Nevada Counties, California (FERC No. 2310),” executed on _____, and including but not limited to the Historic Properties Management Plan (HPMP) for the project. In the event that the Programmatic Agreement is terminated, the licensee shall continue to implement the provisions of its approved HPMP. The Commission reserves the authority to require changes to the HPMP at any time during the term of the license.

Draft Article 4XX. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not

require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

Appendix G

Draft License Articles: Yuba-Bear Project

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DRAFT LICENSE ARTICLES: YUBA-BEAR PROJECT

I. MANDATORY CONDITIONS

On August 23, 2012, the U.S. Department of Agriculture, Forest Service (Forest Service) filed 46 conditions (described in section 2.2.4.2 of the environmental impact statement [EIS] and included in appendix I-1). We consider 23 of these conditions (2 through 11, 13 through 15, 17 through 22, 24, 25, 32, and 46) to be administrative or legal in nature and not specific environmental measures. Of the 23 conditions we consider to be environmental measures, we include 18¹ of these conditions in the staff alternative as specified by the Forest Service. We recognize, however, that the Federal Energy Regulatory Commission (Commission) is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.2.2, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with the Forest Service's corresponding conditions, as filed with the Commission.

On August 27, 2012, the U.S. Department of the Interior, Bureau of Land Management (BLM) filed 66 conditions (described in section 2.2.4.2 of the EIS and included in appendix I-2). We consider 23 of these conditions (14, 43 through 51, 53, 54, 55, and 57 through 66) to be administrative or legal in nature and not specific environmental measures. Of the 43 conditions we consider to be environmental measures, we include 38² of these conditions in the staff alternative as specified by BLM. We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.2.2, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with BLM's corresponding conditions, as filed with the Commission.

II. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project in addition to the mandatory conditions.

¹ As explained in section 5 of the EIS, we recommend modifying the following conditions specified by the Forest Service: (1) Flow Measures (aspects of condition 29); (2) Terrestrial Protective Measures (aspects of condition 34); (3) Monitoring Program (condition 35); (4) Recreation Plan (condition 41); and (5) Historic Properties Management Plan (condition 43). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 12/34).

² As explained in section 5 of the EIS, we recommend modifying the following conditions specified by BLM: (1) Ecological Group (condition 12); (2) Monitoring Program (condition 23); (3) general recreation site measures (condition 31); (4) Chicago Park Power House and Connecting Facilities and Roads (condition 34); and (5) and Historic Properties Management Plan (condition 38). We do not recommend preparation of a biological evaluation for construction of project-related facilities not addressed in the Commission's EIS (conditions 20/52).

Draft Article 4XX. *Commission Approval, Notification, and Filing of Amendments.*

(a) Requirement to File Plans for Commission Approval

Various mandatory conditions specified by the Forest Service and Bureau of Land Management (BLM) under section 4(e) require the Nevada Irrigation District (NID) to prepare plans in consultation with other entities for approval by the Forest Service and BLM; some of these measures do not specify that Commission approval is required prior to implementation. Each such plan shall also be submitted to the Commission for approval. These plans are listed below.

Forest Service condition	Plan name	Due date
23	Oil And Hazardous Substances Storage And Spill Prevention And Cleanup Plan	Within 1 year of license issuance
26	Slope Assessment and Facility Release Access Plan	Within 1 year of license issuance
27	Erosion and Sediment Control Management Plan	Within 1 year of license issuance
28	Coordinated Operations Plan	Within 90 days of license issuance
30	Canal Outages Fish Rescue Plan	Not specified
31	Gaging Plan	Not specified
33	Aquatic Invasive Species Management Plan	Within 1 year of license issuance
34	Vegetation and Non-Native Invasive Plant Management Plan	Within 1 year of license issuance
34	Bald Eagle Management Plan	Not specified
35	Final study plans for each element of the Monitoring Program	Not specified
41	Recreation Plan	Not specified
42	Visual Resource Management Plan	Not specified
43	Historic Properties Management Plan	Upon license issuance

BLM condition	Plan name	Due date
1	Coordinated Operations Plan	Within 90 days of license issuance
11	Canal Outages Fish Rescue Plan	Not specified
13	Gaging Plan	Not specified
15	Aquatic Invasive Species Management	Within 1 year of license issuance
16	Vegetation and Non-Native Invasive Plant Management Plan	Within 1 year of license issuance
19	Bald Eagle Management Plan	Not specified
23	Final study plans for each element of the Monitoring Program	Not specified
24	Large Woody Debris Management Plan for Dutch Flat reservoir	Within 1 year of license issuance
25	Slope Assessment and Facility Release Plan	Within 1 year of license issuance
26	Recreation Plan	Not specified
42	Visual Resource Management Plan	Not specified
38	Historic Properties Management Plan	Upon license issuance
39	Transportation System Management Plan	Within 1 year of license issuance
40	Fire Management and Response Plan	Within 1 year of license acceptance
41	Erosion and Sediment Control and Management	Within 1 year of license acceptance

(b) Requirement to File Reports

Some Forest Service and BLM section 4(e) conditions require NID to file reports with other entities. These reports document compliance with requirements of this license and may have a bearing on future actions. Each such report shall also be submitted to the Commission. These reports are listed in the following table.

Forest Service condition	Description	Due date
1	Reports documenting annual meetings with the Forest Service and other stakeholders	Within 60 days of the meeting
1	Reports documenting issues related to public safety and non-compliance	As soon as possible
29	Report documenting flow setting measures undertaken	Provide at annual consultation meeting
34	File design of wildlife escape or crossing changes and documentation of consultation	Within 60 days of replacement or retrofit

Forest Service condition	Description	Due date
34	Recommendations and implementation schedule to reduce animal mortality in canal, if increasing mortality trend	Following direction from review at annual consultation meeting
34	Biological evaluation for special status species and their habitats for construction of new project features	Prior to construction action
34	Report on condition and maintenance activity for Bowman-Spaulding canal wildlife crossings	Annually
34	Report record of observation of raptor collision	60 days before annual meeting
35	Annual report describing monitoring efforts of previous calendar year	June 30, annually
35	5-Year summary monitoring report	Year 5, 10, 20, 30, etc.
37	6-year and 12-year Recreation Survey and Monitoring Reports	Not specified
BLM condition	Description	Due date
10	Report results of foothill yellow-legged frog monitoring	December 31 of years when monitoring occurs
11	Recommendations and implementation schedule to reduce animal mortality in canal, if increasing mortality trend	Following direction from review at annual consultation meeting
13	Biological evaluation for special status species and their habitats for construction of new project features	Prior to construction action
21	Results of studies on newly added special status species	As species added
23	Annual report describing monitoring efforts of previous calendar year	June 30, annually
23	5-Year Summary monitoring report	Year 5, 10, 20, 30, etc.
30	6-year and 12-year Recreation Survey and Monitoring Reports	Not specified
42	Reports documenting annual meetings with BLM and other stakeholders	Within 60 days of the meeting
42	Reports documenting issues related to public safety and non-compliance	As soon as possible

(c) Requirement to Notify Commission of Planned and Unplanned Deviations from License Requirements

Certain Forest Service and BLM 4(e) conditions would allow NID to temporarily modify project operations under certain situations. The Commission shall be notified prior to implementing such modifications, if possible, or in the event of an emergency, as soon as possible, but no later than 10 days after each such incident.

Forest Service condition	License requirement
29	Temporary modification of minimum streamflows following consultation or due to an emergency
29	Notification of schedule or change of schedule for routine and non-routine planned canal outages affecting minimum streamflows; notification within 1 business day of emergency canal outage
29	Notification and consultation on minimum streamflows during canal outages lasting longer than 30 days

BLM condition	License requirement
5	Notification of schedule or change of schedule for routine and non-routine planned canal outages affecting minimum streamflows; notification within 1 business day of emergency canal outage
5	Notification and consultation on minimum streamflows during canal outages lasting longer than 30 days

(d) Requirement to File Amendment Applications

Certain Forest Service, BLM, and Bureau of Reclamation (Reclamation) conditions appear to contemplate these agencies requiring unspecified long-term changes to project operations or facilities based on new information or results of monitoring but do not appear to require Commission approval for such changes (e.g., modification of supplemental flows, anadromous fish introduction). Such changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license.

Draft Article 4XX. Reservation of Authority to Prescribe Fishways. Authority is reserved to the Commission to require the licensee to construct, operate, and maintain or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretaries of Interior or Commerce pursuant to section 18 of the Federal Power Act.

Draft Article 4XX. Vegetation and Non-Native Invasive Plant Management Plan. The Vegetation and Non-Native Invasive Plant Management Plan required by Forest Service condition 34 and BLM condition 16 shall also cover private lands and provide for the protection of culturally important species to the tribes. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Fish Stocking Plan. Within 1 year of license issuance, the licensee shall file with the Commission for approval, a plan to evaluate and monitor the location, frequency, age, and number/weight of fish to be stocked in Bowman Lake, Rollins reservoir, Faucherie Lake, and Jackson Meadows reservoir. The plan shall include provisions for periodic review of angling use levels, including fish stocking at additional reservoirs should the need arise based on the periodic review, and annual consultation with the California Department of Fish and Wildlife (California Fish and Wildlife), Forest Service, U.S. Fish and Wildlife Service (FWS), and BLM.

The Fish Stocking Plan shall be developed after consultation with California Fish and Wildlife, the Forest Service, FWS, and BLM. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Recreation Plan. The Recreation Plan required by Forest Service condition 41 and BLM condition 26 shall also include the following:

- (1) Develop parking and unloading area at Woodcamp picnic area
- (2) Develop a gravel parking area with vehicle barriers and an information board at inflow day-use area at Bowman Lake;
- (3) Replace flush restroom buildings with vault models at Fir Top campground;
- (4) Replace flush restroom buildings with vault models at Woodcamp campground and sign the dam day-use area at Sawmill Lake for day use only;
- (3) Construct and maintain an accessible trail on the shoreline at Pass Creek boat launch;
- (4) Construct a pedestrian trail at Aspen Group campground;
- (5) Develop a shoreline day-use area at day-use area at Milton Diversion;
- (6) Install animal-resistant food lockers at Jackson Meadows reservoir; and
- (7) Provide an implementation schedule for all repairs, upgrades, and rehabilitation improvements to project recreation facility developments.

The plan filed with the Commission shall include documentation of consultation with the Forest Service, BLM, and California Fish and Wildlife; copies of recommendations on the completed plan after it has been prepared and provided to the entities above; and a specific description of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Supplemental Flows for Whitewater Boating.

Beginning in the first full calendar year after license issuance, the licensee shall release a whitewater boating flow ranging from 100 to 150 cubic feet per second as measured at gage YB-306 in Canyon Creek below French dam. Between September 1 and September 30 of each year, the whitewater

boating flow release shall be provided over a continuous 24-hour period or until the water surface elevation of French Lake reaches 6,638 feet mean-sea-level.

If the whitewater boating flow cannot be released due to insufficient water (water surface elevation of less than 6,638), equipment malfunction, or an emergency event, the licensee shall notify the Commission of a modification to the release schedule.

Draft Article 4XX. Recreation Flow Information. Within 1 year of license issuance, the licensee shall provide the public access via its webpage on the internet to mean daily streamflow information on a year-round basis at Middle Yuba River below Milton diversion dam, Canyon Creek below Bowman dam, and Bear River below Rollins dam, and mean daily reservoir elevations for Jackson Meadows reservoir, and French, Faucherie, Sawmill, Jackson, Bowman, and Rollins Lakes.

Draft Article 4XX. Fire Prevention and Response Plan. The Fire Prevention and Response Plan required by Forest Service condition 45 and BLM condition 18 shall cover all lands within the project boundary and shall include a period of review and revision. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Hazardous Substances Plan. The Hazardous Substances Plan required by Forest Service condition 23 and BLM condition 49 shall cover all project lands and the Bureau of Reclamation shall be consulted during the development of the plan. The Commission reserves the right to require changes to the plan.

Draft Article 4XX. Programmatic Agreement and Historic Properties Management Plan. The licensee shall implement the “Programmatic Agreement Between the Federal Energy Regulatory Commission and the State of California Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuing of a License to NID for the Yuba-Bear Hydroelectric Project in Nevada, Sierra, and Placer Counties, California (FERC No. 2266),” executed on _____, and including but not limited to the Historic Properties Management Plan (HPMP) for the project. In the event that the Programmatic Agreement is terminated, the licensee shall continue to implement the provisions of its approved HPMP. The Commission reserves the authority to require changes to the HPMP at any time during the term of the license.

Draft Article 4XX. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers,

landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

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Appendix H

4(e) Conditions: Drum-Spaulding Project

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Appendix H-1

Forest Service 4(e) Conditions: Drum-Spaulding Project

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Revised
FS Preliminary Conditions and Recommendations Provided
Under 18 CFR § 4.34 (b)(1)
In Connection with the Application for Relicensing for the
Drum-Spaulling Hydroelectric Project
(FERC No. 2310)

23 August 2012

INTRODUCTION

On July 31, 2012, the USDA Forest Service (FS) provided Preliminary Section 4(e) conditions for the Drum-Spaulding Hydroelectric Project, FERC No. 2310, in accordance with 18 CFR 4.34(b)(1)(i). After those conditions were filed, the Forest Service participated in several meetings and discussions with the Licensee, other resource agencies, and non-governmental organizations in an effort to reach agreement on conditions that one entity or another had concerns with. Based on these meetings and discussions, the Forest Service submits the following revised Preliminary Section 4(e) conditions for the Drum-Spaulding Hydroelectric Project, FERC No. 2310. Please note that conditions that are not referenced in the following document have not changed from our original filing of July 31, 2012. Please also note that changes are shown in redline.

The USDA Forest Service (FS) provides the following Preliminary Section 4(e) conditions for the Drum-Spaulding Hydroelectric Project, FERC No. 2310, in accordance with 18 CFR 4.34(b)(1)(i). Section 4(e) of the Federal Power Act (FPA), which states the Commission may issue a license for a project within a reservation only if it finds that the License will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. This is an independent threshold determination made by FERC, with the purpose of the reservation defined by the authorizing legislation or proclamation (see *Rainsong v. FERC*, 106 F.3d 269 (9th Cir. 1977)). FS, for its protection and utilization determination under Section 4(e) of the FPA, may rely on broader purposes than those contained in the original authorizing statutes and proclamations in prescribing conditions (see *Southern California Edison v. FERC*, 116 F.3d 507 (D.C. Cir. 1997)).

The following terms and conditions are based on those resource and management requirements enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved by Land and Resource Management Plans prepared in accordance with the National Forest Management Act. Specifically, the 4(e) conditions in this document are based on the Land and Resource Management Plans (as amended) for the Eldorado and Tahoe National Forests, as approved by the Regional Forester of the Pacific Southwest Region.

Pursuant to Section 4(e) of the Federal Power Act, the Secretary of Agriculture, acting by and through FS, considers the following conditions necessary for the adequate protection and utilization of the land and resources of the Tahoe National Forest. License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 (revised October 1975) issued by Order No. 540, dated October 31, 1975, cover general requirements. Part I of this document includes administrative conditions deemed necessary for the administration of National Forest System (NFS) lands. Part II of this document includes specific resource requirements for protection and utilization of NFS lands.

PART I: ADMINISTRATIVE CONDITIONS

Condition No. 1 – Consultation

Licensee shall annually consult with the United States Department of Agriculture, FS (FS). The date of the consultation meeting will be mutually agreed to by Licensee and FS but in general should be held by April 15. At least 30 days in advance of the meeting, Licensee shall notify Nevada Irrigation District (NID) and other interested stakeholders, confirming the meeting location, time and agenda. At the same time, Licensee shall also provide notice to United States Department of Interior (USDI) Bureau of Land Management (BLM), USDI Fish and Wildlife Service (FWS), and USDI National Park Service; California State Department of Fish and Game (CDFG) and State Water Resources Control Board (State Water Board); United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fishery Service (NMFS), who may choose to participate in the meeting. Licensee shall attempt to coordinate the meeting so interested agencies and other stakeholders may attend.

Licensee shall make available to FS, BLM, CDFG, and State Water Board at least 2 weeks prior to the meeting, an operations and maintenance plan for the year in which the meeting occurs. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Project area, including progress reports on other resource measures. The goals of this meeting are to share information, mutually agree upon planned maintenance activities, identify concerns that FS may have regarding activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate potential effects. In addition, the goal of the meeting shall be to review and discuss the results of implementing the streamflow and reservoir-related conditions, results of monitoring, and other issues related to preserving and protecting ecological values affected by the Project.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions.
- Results of any monitoring studies performed over the previous year in formats agreed to by FS and Licensee during development of implementation plans.
- Review of any non-routine maintenance.
- Discussion of any foreseeable changes to Project facilities or features.
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection. Discussion of needed protection measures for newly discovered cultural resource sites.
- Discussion of elements of current year maintenance plans, e.g. road and trail maintenance.
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by Licensee and shall include any recommendations made by FS for the protection of NFS lands and resources. Licensee shall file the meeting record, if requested, with FERC no later than 60 days following the meeting.

Copies of other reports related to Project safety and non-compliance shall be submitted to FS, BLM, CDFG, State Water Board, and other interested agencies and stakeholders concurrently with submittal to the Commission. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting NFS lands.

A copy of the record for the previous water year regarding streamflow, study reports, and other pertinent records shall be provided to FS, BLM, CDFG, State Water Board, and other interested agencies and stakeholders by Licensee at least 60 days prior to the meeting date, unless otherwise agreed.

Copies of other reports related to monitoring, Project safety, and non-compliance on NFS lands shall be submitted to FS concurrently with submittal to the Commission, with the goal of providing the material to FS no later than 90 days in advance of the Annual Meeting. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities.

During the first several years of license implementation, it is likely that more consultation than just one Annual Meeting will be required, given the complexity of these projects.

FS reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the Section 4(e) conditions to accomplish protection and utilization of NFS lands and resources.

Condition No. 2 - FS Approval of Final Design

Before any new construction of the Project occurs on National Forest System lands, Licensee shall obtain prior written approval of FS for all final design plans for Project components, which FS deems as affecting or potentially affecting National Forest System resources. Licensee shall follow the schedules and procedures for design review and approval specified in the conditions herein. As part of such written approval, FS may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by FS based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed necessary by FS, the Commission, or Licensee to be a substantial change, Licensee shall follow the procedures of FERC Standard Article 2 of the license. Any changes to the license made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the Federal Power Act.

Condition No. 3 - Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect NFS lands, Licensee shall obtain written approval from FS prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from FS, and a minimum of 60 days prior to initiating any such changes, Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of FS for such changes. Licensee shall file an exact copy of this report with FS at the same time it is filed with the Commission. This condition does not relieve Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition No. 4 - Maintenance of Improvements on or Affecting National Forest System Lands

Licensee shall maintain all its improvements and premises on NFS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to FS. Disposal of all materials will be at an approved existing location, except as otherwise agreed by FS.

Condition No. 5 - Existing Claims

License shall be subject to all valid claims and existing rights of third parties. The United States is not liable to Licensee for the exercise of any such right or claim.

Condition No. 6 - Compliance with Regulations

Licensee shall comply with the regulations of the Department of Agriculture for activities on National Forest System lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting National Forest System lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 7 - Surrender of License or Transfer of Ownership

Prior to any surrender of this license, Licensee shall provide assurance acceptable to FS that Licensee shall restore any project area directly affecting National Forest System lands to a condition satisfactory to FS upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such National Forest System lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the project, Licensee shall assure that, in a manner satisfactory to FS, Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by FS to assist it in evaluating Licensee's proposal, Licensee shall conduct an analysis, using experts approved by FS, to estimate the potential costs associated

with surrender and restoration of any project area directly affecting National Forest System lands to FS specifications. In addition, FS may require Licensee to pay for an independent audit of the transferee to assist FS in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 8 - Protection of United States Property

Licensee, including any agents or employees of Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this license.

Condition No. 9 – Indemnification

Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 10 - Damage to Land, Property, and Interests of the United States

Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from Licensee's construction, maintenance, or operation of the project works or the works appurtenant or accessory thereto under the license. Licensee's liability for fire and other damages to National Forest System lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition No. 11 - Risks and Hazards on National Forest System Lands

As part of the occupancy and use of the project area, Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly

affecting National Forest System lands within the project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on National Forest System lands shall be performed after consultation with FS. In emergency situations, Licensee shall notify FS of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not FS is notified or provides consultation, Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 12 – Protection of FS Special Status Species

Before taking actions to construct new project features on NFS lands that may affect FS special status species or their critical habitat, Licensee shall prepare and submit a biological evaluation (BE) for FS approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, FS may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition No. 13 – Access

Subject to the limitations set forth under the heading of “Access by the United States” in Condition No. 21 hereof, FS reserves the right to use or permit others to use any part of the licensed area on NFS lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 14 – Crossings

Licensee shall maintain suitable crossings as required by FS for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition No. 15 - Surveys, Land Corners

Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on National Forest System lands are destroyed by an act or omission of Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2)

the specifications of the County Surveyor, or (3) the specifications of FS. Further, Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 16 - Pesticide-Use Restrictions on National Forest System Lands

Pesticides may not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of FS. During the Annual Meeting described in Condition No. 1, Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. Licensee shall provide at a minimum the following information essential for review:

- Whether pesticide applications are essential for use on NFS lands;
- Specific locations of use;
- Specific herbicides proposed for use;
- Application rates;
- Dose and exposure rates; and
- Safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Any pesticide use that is deemed necessary to use on NFS lands within 500 feet of known locations of Western Pond Turtles, Sierra Nevada Yellow-Legged Frog, Foothill Yellow Legged Frog, or known locations of FS Special Status or culturally significant plant populations will be designed to avoid adverse effects to individuals and their habitats. Application of pesticides must be consistent with FS riparian conservation objectives.

On NFS lands, Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by FS and approved through FS review for the specific purpose planned. Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other FS required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition No. 34: Vegetation and Non-Native Invasive Plant Management Plan. Submission of this plan will not relieve Licensee of the responsibility of annual notification and review.

Condition No. 17 - Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

FS reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

Condition No. 18 – Signs

Licensee shall consult with FS prior to erecting signs related to safety issues on NFS lands covered by the license. Prior to Licensee erecting any other signs or advertising devices on NFS lands covered by the license, Licensee must obtain the approval of FS as to location, design, size, color, and message. Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

Condition No. 19 – Ground Disturbing Activities

If Licensee proposes ground-disturbing activities on or directly affecting NFS lands that were not specifically addressed in the Commission's NEPA processes, Licensee, in consultation with FS, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon FS request, Licensee shall enter into an agreement with FS under which Licensee shall fund a reasonable portion of FS staff time and expenses for staff activities related to the proposed activities.

Condition No. 20 – Use of National Forest System Roads for Project Access

Licensee shall obtain suitable authorization for all project access roads and NFS roads needed for Project access. The authorization shall require road maintenance and cost sharing in reconstruction commensurate with Licensee's use and project-related use. The authorization shall specify road maintenance and management standards that provide for traffic safety, minimize erosion, and damage to natural resources and that are acceptable to FS as appropriate.

Licensee shall pay FS for its share of maintenance cost or perform maintenance or other agreed to services, as determined by FS for all use of roads related to project operations, project-related public recreation, or related activities. The maintenance obligation of Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by Licensee shall be authorized by and shall be performed in accordance with an approved maintenance plan and applicable Best Management Practices (BMPs). In the event a road requires maintenance, restoration, or reconstruction work to accommodate Licensee's needs, Licensee shall perform such work at its own expense after securing FS authorization.

Licensee shall complete a condition survey and a proposed maintenance plan subject to FS review and approval as appropriate once each year. The plan may take the format of a road maintenance agreement provided all the above conditions are met as well as the conditions set forth in the proposed agreement.

In addition, all NFS roads used as Project Access roads (PAR) and Right-of-Way access roads (ROW) shall have:

- Current condition survey.
- Be mapped at a scale to allow identification of specific routes or segments.
- FS assigned road numbers are used for reference on the maps, tables, and in the field.

- GIS compatible files of GPS alignments of all roads used for Project access are provided to FS.
- Adequate signage is installed and maintained by Licensee at each road or route, identifying the road by FS road number.

Condition No. 21 - Access By The United States

The United States shall have unrestricted use of any road over which Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause Licensee to bear a share of costs disproportionate to Licensee's use in comparison to the use of the road by others.

Condition No. 22 - Road Use

Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Transportation System Management Plan (refer to Condition No. 44). FS reserves the right to close any and all such routes where damages is occurring to the soil or vegetation or, if requested by Licensee, to require reconstruction/construction by Licensee to the extent needed to accommodate Licensee's use. FS agrees to provide notice to Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 23 - Hazardous Substances Plan

Within 1 year of license issuance or prior to undertaking activities on NFS lands, Licensee shall file with the Commission a plan approved by FS for oil and hazardous substances storage and spill prevention and cleanup. The plan shall show evidence of consultation with State Water Board, CDFG, and the Regional Water Quality Control Board (RWQCB). In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, Licensee shall notify FS, and in consultation with State Water Board, CDFG, and RWQCB, FS shall make a determination whether a plan approved by FS for oil and hazardous substances storage and spill prevention and cleanup is needed. Any such plan shall be filed with the Commission.

At a minimum, the plan must require Licensee to (1) maintain in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project; (2) to periodically inform FS of the location of the spill cleanup equipment on NFS lands and of the location, type, and quantity of oil and hazardous substances stored in the project area; and (3) to inform FS immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan shall include a monitoring plan that details corrective measures that will be taken if spills

occur. The plan shall include a requirement for a weekly written report during construction documenting the results of the monitoring.

Condition No. 24 - Construction Inspections

Within 60 days of planned ground-disturbing activity on or affecting NFS lands, Licensee shall file with the Commission a Safety During Construction Plan that identifies potential hazard areas and measures necessary to address public safety. Areas to consider include construction activities near public roads, trails, and recreation areas and facilities.

Licensee shall perform daily (or on a schedule otherwise agreed to by FS in writing) inspections of Licensee's construction operations on N FS lands and Licensee adjoining property while construction is in progress. Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to FS on a schedule agreed to by FS. The inspections must specifically include fire plan compliance, public safety, and environmental protection. Licensee shall act immediately to correct any items found to need correction.

A registered professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements on a schedule approved by FS.

Condition No. 25 - Unattended Construction Equipment

Licensee shall not place construction equipment on NFS lands prior to actual use or allow it to remain on NFS lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by FS.

Conditions No. 26 – Slope Assessment and Facility Release Access Plan

Licensee shall, within 1 year after license issuance, file with the Commission a plan developed in consultation with FS, BLM, CDFG, and State Water Board and approved by FS as follows:

- Assessment of landslide hazards by a qualified engineering geologist for slopes above and below open sections of canal and other project facilities. Based on this assessment, conduct slope stability analysis in locations that are considered moderately to highly unstable.
- Assessment of past canal breach areas to determine erosive condition of slopes below these areas. Make recommendations to repair erosive areas that have been damaged by breaches of canal system.
- Conduct an assessment of penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when the release points are used. Consider information collected in the landslide hazard and erosive condition assessments described above when setting priority release points.
- The plan shall include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations.

Licensee shall implement the plan upon approval.

Condition No. 27 – Erosion and Sediment Control and Management

Within 1 year of license issuance, Licensee shall file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with FS and other interested parties, and approved by FS that will provide direction for treating erosion and controlling sedimentation within the Project and Project-affected NFS lands during the term of the new license. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in the referenced by this condition, unless otherwise agreed to by FS during Plan finalization. Minimum components include, but may not be limited to:

Erosion Control Guidelines for Existing Project-Affected Areas

- Methods for initial and periodic inventory and monitoring of the entire Project area and Project-affected NFS lands to identify erosion sites and assess site condition for each. Periodic monitoring and inventory will include recording effectiveness of erosion treatment measures, and identification of new erosion sites for the term of the new license.
- Criteria for ranking and treating erosion sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site.
- Erosion control measures that incorporate current standards, follow FS regulations and guidance (e.g. LRMP, RMOs, BMPs), are customized to site-specific conditions, and approved by FS.
- Develop and implement a schedule for treatment (e.g. repair, mitigate, monitor) of erosion sites, including a list of sites requiring immediate mitigation and schedule for their implementation.
- Effectiveness monitoring of completed erosion control treatment measures after treatment in order to determine if further erosion control measures are needed. If erosion control measures are not effective, Licensee will implement additional erosion control measures approved by FS and continue monitoring until the site has stabilized.
- Protocols for emergency erosion and sediment control.
- Process for documenting and reporting inventory and monitoring results including periodic plan review and revision. Documentation shall include a FS compatible GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results.

Erosion Control Guidelines for New Construction or Non-Routine Maintenance

Licensee shall develop site-specific temporary erosion control measures for each project to be approved by FS. These temporary measures will prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent measures.

PART II: RESOURCE CONDITIONS

Condition No. 28 – General Resource Measures

Annual Employee Training

Licensee shall, beginning in the first full calendar year after license issuance, annually perform employee awareness training and shall also perform such training when a staff member is first assigned to the Project. The goal of the training shall be to familiarize Licensee's operations and maintenance (O&M) staff with special-status species, noxious weeds and sensitive areas (e.g., special-status plant populations and noxious weed populations) that are known to occur within or adjacent to the FERC Project Boundary on NFS lands, and the procedures for reporting to each agency, as appropriate, to comply with the license requirements. It is not the intent of this measure that Licensee's O&M staff perform surveys or become specialists in the identification of special-status species or noxious weeds. Licensee shall direct its O&M staff to avoid disturbance to sensitive areas, and to advise all Licensee contractors to avoid sensitive areas. If Licensee determines that disturbance of a sensitive area is unavoidable, Licensee shall consult with FS to minimize adverse effects to sensitive resources. This measure applies to employee training that is not otherwise covered by a specific plan.

Coordinated Operations Plan

Licensee shall, within 90 days of the issuance of the new license for the Drum-Spaulding Project or the Yuba-Bear Hydroelectric Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan (Plan). Licensee shall develop the Plan in consultation with Licensee for the Yuba-Bear Hydroelectric Project. The purpose of the Plan shall be to provide for coordination between the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project regarding implementation of flow-related measures in each Project's license. Licensee shall file the Plan, with evidence of consultation as the Plan relates to compliance with flow-related measures, with FS, BLM, CDFG, State Water Board, and Licensee of the Yuba-Bear Hydroelectric Project, with the Commission. Licensee shall implement those portions of the Plan approved by the Commission.

Condition No. 29 - Flow Measures

Water Year Types

Within 90 days of license issuance, Licensee shall in each year in each of the months of February, March, April, May and October determine water year type as described in Table 1 of this measure. Licensee shall use this determination in implementing articles and conditions of the license that are dependent on water year type. Water year types shall be defined as:

Table 1. Water Year types for the Drum-Spaulling Project.

Water Year Type	DWR Forecast of Total Unimpaired Runoff in the Yuba River at Smartville in Thousand Acre-Feet or DWR Full Natural Flow Near Smartville for the Water Year in Thousand Acre-Feet ¹
Extreme Critically Dry	Equal to or Less than 615 or second year of back-to-back Critically Dry Water Years (≤ 900)
Critically Dry	616 to 900
Dry	901 to 1,460
Below Normal	1,461 to 2,190
Above Normal	2,191 to 3,240
Wet	Greater than 3,240

¹DWR rounds the Bulletin 120 forecast to the nearest 1,000 acre-feet. The Full Natural Flow is provided to the nearest acre-foot, and Licensee will round DWR's Full Natural Flow to the nearest 1,000 acre-feet.

In each of the months of February, March, April and May, the water year type shall be based on California Department of Water Resources (DWR) water year forecast of unimpaired runoff in the Yuba River at Smartville as set forth in DWR's Bulletin 120 entitled "Water Year Conditions in California." DWR's forecast published in February, March and April shall apply from the 15th day of that month to the 14th day of the next month. From May 15 through October 14, the water year type shall be based on DWR's forecast published in May.

From October 15 through February 14 of the following year, the water year type shall be based on the sum of DWR's monthly (not daily) full natural flow for the full water year for the Yuba River near Smartville as made available by DWR on the California Data Exchange Center (CDEC) in the folder named "FNF Sum." (Currently these data are available at: <http://cdec.water.ca.gov/cgi-progs/stages/FNFSUM>). If DWR does not make the full natural flow for the full water year available until after October 14 but prior to or on October 31, from 3 days after the date the full natural flow is made available until February 14 of the following year, the water year type shall be based on the sum of DWR's monthly full natural flow for the full water year as made available. If DWR does not make available the final full natural flow by October 31, the water year type from November 1 through February 14 of the following year shall be based on DWR's May Bulletin 120.

Minimum Streamflows

Licensee shall meet the Minimum Streamflows shown in Table 2 of this measure.

Minimum Streamflows shall mean the instantaneous flow except as otherwise provided below, Licensee shall record instantaneous streamflow as required by United States Geological Survey (USGS) standards at all gages:

- Minimum Streamflows may be temporarily modified for short periods upon consultation with CDFG, State Water Board, FS, and BLM and approval by FS and notification to the Commission.
- Minimum Streamflows may be temporarily modified due to an emergency. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the

imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. If the Minimum Streamflows are so modified, Licensee shall notify the Commission, CDFG, SWRCB, FS, and BLM as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after such modification.

Except as otherwise provided, Licensee shall implement Minimum Streamflows within 90 days of license issuance, unless facility modifications or construction are necessary. Where facilities must be modified or constructed to allow compliance with the required Minimum Streamflows, including flow measurement facilities, except as otherwise provided, Licensee shall submit applications for permits to modify or construct the facilities as soon as reasonably practicable but no later than two years after license issuance and will complete the work as soon as reasonably practicable but no later than two years after receiving all required permits and approvals for the work. During the period before facility modifications or construction are completed, and starting within 90 days after license issuance, Licensee shall make a good faith effort to provide the specified Minimum Streamflows within the reasonable capabilities of the existing facilities.

Table 2. Minimum Streamflows in cubic feet per second (cfs) for specified reaches by month and water year type.

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SOUTH YUBA RIVER - BELOW KIDD LAKE DAM AND LOWER PEAK LAKE DAM (AT CISCO GROVE) (COMPLIANCE POINT: YB-316; USGS STREAMFLOW GAGE 11414000)						
October	5	5	5	5	5	5
November	5	5	5	5	5	5
December	5	5	5	5	5	5
January	5	5	5	5	5	5
February	5	5	5	5	5	5
March	5	5	5	5	5	5
April	5	5	5	5	5	5
May	5	5	5	5	5	5
June	5	5	5	5	5	5
July	5	5	5	5	5	5
August	5	5	5	5	5	5
September	5	5	5	5	5	5
FORDYCE CREEK - BELOW FORDYCE LAKE DAM (COMPLIANCE POINT: YB-200; USGS STREAMFLOW GAGE 11414100)						
October	20	20	20	25	25	25
November	15	15	15	20	25	25
December	15	15	15	20	25	25
January	15	15	15	20	25	25
February	15	15	15	20	25	25
March	15	15	15	20	25	25
April	15	15	15	20	25	25
May	40	40	40	40	45	45
June	30	30	30	30	45	45
July	25	25	25	25	30	30
August	20	20	20	25	25	25
September	20	20	20	25	25	25
SOUTH YUBA RIVER - BELOW LAKE SPAULDING DAM (COMPLIANCE POINT: YB-29; USGS STREAMFLOW GAGE 11414250)						
October	10*/20	20	20	25	25	30
November	10*/20	20	20	25	25	30
December	10*/20	20	20	25	25	30
January	10*/20	20	20	25	25	30
February	10*/20	25	25	35	40	50
March	10*/20	25	30	40	55	75
April	10*/20	30	40	60	80	90
May	10*/20	40	60	90	90	90
June 1-14	10*/20	35	40	50	90	90
June 15-30	20	35	40	50	90	90
July	20	25	30	35	40	40
August	20	20	23	25	40	40
September 1-15	20	20	23	25	40	40
September 16 - 30	20	20	20	25	28	30

* In the case where an EC water year (less than 615,000 ac-ft at Smartsville) is preceded by an EC or CD water year, the minimum streamflow shall be 10 cfs from September 1 to June 14.

Table 2. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SOUTH FORK DEER CREEK - BELOW DEER CREEK POWERHOUSE (COMPLIANCE POINT: YB-34 IN SOUTH YUBA CANAL)						
October	5	5	5	5	5	5
November	5	5	5	5	5	5
December	5	5	5	5	5	5
January	5	5	5	5	5	5
February	5	5	5	5	5	5
March	5	5	5	5	5	5
April	5	5	5	5	5	5
May	5	5	5	5	5	5
June	5	5	5	5	5	5
July	5	5	5	5	5	5
August	5	5	5	5	5	5
September	5	5	5	5	5	5
NORTH FORK OF NORTH FORK AMERICAN RIVER - BELOW LAKE VALLEY RESERVOIR DAM (COMPLIANCE POINT: YB-104)						
October	2	2	3	3	3	4
November	2	2	3	3	3	4
December	2	2	3	3	3	4
January	2	2	3	3	3	4
February	2	2	3	3	3	4
March	2	2	3	3	3	4
April	2	4	4	6	8	10
May	2	6	6	9	11	15
June	2	5	5	6	8	10
July	2	3	3.5	5	5.5	6
August	2	3	3.5	5	5.5	6
September	2	3	3.5	5	5.5	6
NORTH FORK OF NORTH FORK AMERICAN RIVER - BELOW LAKE VALLEY CANAL DIVERSION DAM (COMPLIANCE POINT: YB-236)						
October	2.2	2.2	3.2	3.5	3.5	4.5
November	2.2	2.2	3.2	3.5	3.5	4.5
December	2.2	2.2	3.2	3.5	3.5	4.5
January	2.2	2.2	3.2	3.5	3.5	4.5
February	2.2	2.2	3.2	3.5	3.5	4.5
March	2.2	2.2	3.2	3.5	3.5	4.5
April	2.2	4.2	4.2	6.5	8.5	10.5
May	2.2	6.2	6.2	9.5	11.5	15.5
June	2.2	5.2	5.2	6.5	8.5	10.5
July	2.2	3.2	3.7	5.5	6	6.5
August	2.2	3.2	3.7	5.5	6	6.5
September	2.2	3.2	3.7	5.5	6	6.5

Flow Setting

For each location set forth in Table 3 of this measure, by no later than November 1 of each year, Licensee shall set the low-level outlet opening to make the flow release (“the Winter Setting”).³ The following year, Licensee shall not be required to reset the low-level outlet opening at any of the locations below until Licensee can safely access the outlet works (typically in the late spring or early summer), at which time Licensee shall set the low-level outlet for the flow release for that month, as is more fully described in the paragraphs below.

Licensee's license compliance requirement is the act of setting the low-level outlet works for the Winter Setting by no later than November 1 of each year at each location to the applicable flow release, as set forth in Table 3 below. Licensee does not have any additional flow release or flow-setting requirement at these locations between the time that Licensee makes the Winter Setting and the time that Licensee is able to safely access the outlet works the following year. Licensee also has no requirement to collect streamflow compliance data from the time Licensee makes the Winter Setting until Licensee is able to safely access and reset the outlet works the following year.

With the exception of below Lake Sterling Dam and below Fuller Lake Dam, from the time Licensee first accesses each of the following outlet works each year until Licensee makes the Winter Setting the same year, Licensee shall check the outlet works for each location twice each week approximately 3 days apart (from Sunday to Saturday) and, if needed, re-set the outlet works to make the flow release for that location for that month as set forth in Table 3. During this time period each year (approximately late spring or early summer until Licensee makes the Winter Setting the same year), Licensee's license compliance requirement is the act of setting the low-level outlet works at each location twice each week consistent with the flows for that month as set forth in Table 3, and Licensee does not have any additional flow release or flow-setting requirements at these locations.

For below Lake Sterling Dam, from the time Licensee first accesses the outlet works each year until Licensee makes the Winter Setting the same year, Licensee shall check the outlet works for each location twice every 30 days approximately two weeks apart and, if needed, re-set the outlet works to make the flow release for that location for that month as set forth in Table 3. During this time period each year (approximately late spring or early summer until Licensee makes the Winter Setting the same year), Licensee's license compliance requirement is the act of setting the low-level outlet works at Lake Sterling Dam twice each month consistent with the flows for that month as set forth in Table 3, using a Licensee determined theoretical valve set-point reference (head versus flow calibration curve) and Licensee does not have any additional flow release or flow-setting requirements at Lake Sterling Dam.

For below Fuller Lake Dam, when Licensee is able to safely access the low-level outlet (typically in the late spring or early summer), Licensee shall, as needed, re-set the outlet works to release the flow for that location for that month. From approximately late spring or early summer until Licensee makes the Winter Setting the same year, Licensee shall comply with the Minimum Streamflows for below Fuller Lake Dam as set forth in Table 3 of this measure as measured at a continuously measured recording gage, YB-211, downstream of the dam. Minimum Streamflows below Fuller Lake Dam in this measure shall have the same meaning and shall be applied as described and defined in this measure.

At the Annual Meeting, Licensee shall provide CDFG, SWRCB, FS, and BLM a report documenting: (1) the dates Licensee checked the outlet works for each site in Table 3 during the time Licensee first accessed each site until the Winter Setting, (2) the flow at each location in Table 3 each time Licensee checked the outlet works, and (3) documentation showing Licensee reset the outlet works (if necessary) at each site in Table 3 during each time the outlet works were checked.

Table 3. Minimum Streamflows in cubic feet per second for specified reaches by month and water year type.

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
TEXAS CREEK - BELOW UPPER ROCK LAKE DAM (COMPLIANCE POINT: YB-201; USGS STREAMFLOW GAGE 11416585)						
October	0.1	0.1	0.25	0.25	0.25	0.25
November	0.1	0.1	0.25	0.25	0.25	0.25
December	0.1	0.1	0.25	0.25	0.25	0.25
January	0.1	0.1	0.25	0.25	0.25	0.25
February	0.1	0.1	0.25	0.25	0.25	0.25
March	0.1	0.1	0.25	0.25	0.25	0.25
April	0.1	0.1	0.25	0.25	0.25	0.25
May	0.1	0.1	0.25	0.25	0.25	0.25
June	0.1	0.1	0.25	0.25	0.25	0.25
July	0.1	0.1	0.25	0.25	0.25	0.25
August	0.1	0.1	0.25	0.25	0.25	0.25
September	0.1	0.1	0.25	0.25	0.25	0.25
TEXAS CREEK - BELOW LOWER ROCK LAKE DAM (COMPLIANCE POINT: YB-202; USGS STREAMFLOW GAGE 11416610)						
October	0.1	0.1	0.25	0.25	0.25	0.25
November	0.1	0.1	0.25	0.25	0.25	0.25
December	0.1	0.1	0.25	0.25	0.25	0.25
January	0.1	0.1	0.25	0.25	0.25	0.25
February	0.1	0.1	0.25	0.25	0.25	0.25
March	0.1	0.1	0.25	0.25	0.25	0.25
April	0.1	0.1	0.25	0.25	0.25	0.25
May	0.1	0.1	0.25	0.25	0.25	0.25
June	0.1	0.1	0.25	0.25	0.25	0.25
July	0.1	0.1	0.25	0.25	0.25	0.25
August	0.1	0.1	0.25	0.25	0.25	0.25
September	0.1	0.1	0.25	0.25	0.25	0.25
UNNAMED TRIBUTARY - BELOW CULBERTSON LAKE DAM (COMPLIANCE POINT: YB-203; USGS STREAMFLOW GAGE 11416620)						
October	0.3	0.3	0.75	0.75	1.5	1.5
November	0.3	0.3	0.75	0.75	1	1
December	0.3	0.3	0.75	0.75	1	1
January	0.3	0.3	0.75	0.75	1	1
February	0.3	0.3	0.75	0.75	1	1
March	0.3	0.3	0.75	0.75	1	1
April	0.3	0.3	0.75	0.75	1	1
May	0.3	0.3	0.75	0.75	1	1
June	0.3	0.3	0.75	0.75	1.5	1.5
July	0.3	0.3	0.75	0.75	1.5	1.5
August	0.3	0.3	0.75	0.75	1.5	1.5
September	0.3	0.3	0.75	0.75	1.5	1.5

Table 3. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
LINDSEY CREEK - BELOW MIDDLE LINDSEY LAKE DAM (COMPLIANCE POINT: YB-205; USGS STREAMFLOW GAGE 11416670)						
October	0.1	0.1	0.1	0.2	0.2	0.2
November	0.1	0.1	0.1	0.2	0.2	0.2
December	0.1	0.1	0.1	0.2	0.2	0.2
January	0.1	0.1	0.1	0.2	0.2	0.2
February	0.1	0.1	0.1	0.2	0.2	0.2
March	0.1	0.1	0.1	0.2	0.2	0.2
April	0.1	0.1	0.1	0.2	0.2	0.2
May	0.1	0.1	0.1	0.2	0.2	0.2
June	0.1	0.1	0.1	0.2	0.2	0.2
July	0.1	0.1	0.1	0.2	0.2	0.2
August	0.1	0.1	0.1	0.2	0.2	0.2
September	0.1	0.1	0.1	0.2	0.2	0.2
LINDSEY CREEK - BELOW LOWER LINDSEY LAKE DAM (COMPLIANCE POINT: YB-206B; USGS STREAMFLOW GAGE 11416700)						
October	0.2	0.2	0.5	0.7	0.7	0.7
November	0.2	0.2	0.5	0.7	0.7	0.7
December	0.2	0.2	0.5	0.7	0.7	0.7
January	0.2	0.2	0.5	0.7	0.7	0.7
February	0.2	0.2	0.5	0.7	0.7	0.7
March	0.2	0.2	0.5	0.7	0.7	0.7
April	0.2	0.2	0.5	0.7	0.7	0.7
May	0.2	0.2	0.5	0.7	0.7	0.7
June	0.2	0.2	0.5	0.7	0.7	0.7
July	0.2	0.2	0.5	0.7	0.7	0.7
August	0.2	0.2	0.5	0.7	0.7	0.7
September	0.2	0.2	0.5	0.7	0.7	0.7
LAKE CREEK- BELOW FEELEY LAKE DAM (COMPLIANCE POINT: YB-207; USGS STREAMFLOW GAGE 11414350)						
October	0.2	0.2	0.5	1	1	1
November	0.2	0.2	0.5	1	1	1
December	0.2	0.2	0.5	1	1	1
January	0.2	0.2	0.5	1	1	1
February	0.2	0.2	0.5	1	1	1
March	0.2	0.2	0.5	1	1	1
April	0.2	0.2	0.5	1	1	1
May	0.2	0.2	0.5	1	1	1
June	0.2	0.2	0.5	1	1	1
July	0.2	0.2	0.5	1	1	1
August	0.2	0.2	0.5	1	1	1
September	0.2	0.2	0.5	1	1	1

Table 3. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
LAKE CREEK- BELOW CARR LAKE DAM (COMPLIANCE POINT: YB-208; USGS STREAMFLOW GAGE 11414360)						
October	0.2	0.2	0.5	1	1	1
November	0.2	0.2	0.5	1	1	1
December	0.2	0.2	0.5	1	1	1
January	0.2	0.2	0.5	1	1	1
February	0.2	0.2	0.5	1	1	1
March	0.2	0.2	0.5	1	1	1
April	0.2	0.2	0.5	1	1	1
May	0.2	0.2	0.5	1	1	1
June	0.2	0.2	0.5	1	1	1
July	0.2	0.2	0.5	1	1	1
August	0.2	0.2	0.5	1	1	1
September	0.2	0.2	0.5	1	1	1
RUCKER CREEK- BELOW BLUE LAKE DAM (COMPLIANCE POINT: YB-209; USGS STREAMFLOW GAGE 11414265)						
October	0.2	0.2	0.3	0.5	0.5	0.5
November	0.2	0.2	0.3	0.5	0.5	0.5
December	0.2	0.2	0.3	0.5	0.5	0.5
January	0.2	0.2	0.3	0.5	0.5	0.5
February	0.2	0.2	0.3	0.5	0.5	0.5
March	0.2	0.2	0.3	0.5	0.5	0.5
April	0.2	0.2	0.3	0.5	0.5	0.5
May	0.2	0.2	0.3	0.5	0.5	0.5
June	0.2	0.2	0.3	0.5	0.5	0.5
July	0.2	0.2	0.3	0.5	0.5	0.5
August	0.2	0.2	0.3	0.5	0.5	0.5
September	0.2	0.2	0.3	0.5	0.5	0.5
RUCKER CREEK- BELOW RUCKER LAKE DAM (COMPLIANCE POINT: YB-210; USGS STREAMFLOW GAGE 11414280)						
October	0.2	0.2	0.5	0.75	1	1.5
November	0.2	0.2	0.5	0.75	1	1.5
December	0.2	0.2	0.5	0.75	1	1.5
January	0.2	0.2	0.5	0.75	1	1.5
February	0.2	0.2	0.5	0.75	1	1.5
March	0.2	0.2	0.5	0.75	1	1.5
April	0.2	0.2	0.5	0.75	1	1.5
May	0.2	0.2	0.5	0.75	1	1.5
June	0.2	0.2	0.5	0.75	1	1.5
July	0.2	0.2	0.5	0.75	1	1.5
August	0.2	0.2	0.5	0.75	1	1.5
September	0.2	0.2	0.5	0.75	1	1.5

Table 3. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
UNNAMED TRIBUTARY - BELOW FULLER LAKE DAM (COMPLIANCE POINT: YB-211)						
October	0.25	0.25	0.25	0.25	0.25	0.25
November	0.25	0.25	0.25	0.25	0.25	0.25
December	0.25	0.25	0.25	0.25	0.25	0.25
January	0.25	0.25	0.25	0.25	0.25	0.25
February	0.25	0.25	0.25	0.25	0.25	0.25
March	0.25	0.25	0.25	0.25	0.25	0.25
April	0.25	0.25	0.25	0.25	0.25	0.25
May	0.25	0.25	0.25	0.25	0.25	0.25
June	0.25	0.25	0.25	0.25	0.25	0.25
July	0.25	0.25	0.25	0.25	0.25	0.25
August	0.25	0.25	0.25	0.25	0.25	0.25
September	0.25	0.25	0.25	0.25	0.25	0.25
UNNAMED TRIBUTARY - BELOW MEADOW LAKE DAM (COMPLIANCE POINT: YB-217)						
October	1	1	1	1	1	1
November	1	1	1	1	1	1
December	1	1	1	1	1	1
January	1	1	1	1	1	1
February	1	1	1	1	1	1
March	1	1	1	1	1	1
April	1	1	1	1	1	1
May	1	1	1	1	1	1
June	1	1	1	1	1	1
July 1 - 8	5	5	5	5	5	5
July 9 - 17	11	11	11	11	11	11
July 18 - 31	5	5	5	5	5	5
August	1	1	1	1	1	1
September	1	1	1	1	1	1
WHITE ROCK CREEK - BELOW WHITE ROCK DIVERSION DAM (COMPLIANCE POINT: YB-218)						
October	0.5	0.5	0.5	0.5	1	1
November	0.5	0.5	0.5	0.5	1	1
December	0.5	0.5	0.5	0.5	1	1
January	0.5	0.5	0.5	0.5	1	1
February	0.5	0.5	0.5	0.5	1	1
March	0.5	0.5	0.5	0.5	1	1
April	0.5	0.5	0.5	0.5	1	1
May	0.5	0.5	0.5	0.5	1	1
June	0.5	0.5	0.5	0.5	1	1
July	0.5	0.5	0.5	0.5	1	1
August	0.5	0.5	0.5	0.5	1	1
September	0.5	0.5	0.5	0.5	1	1

Table 3. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
BLOODY CREEK - BELOW LAKE STERLING DAM (COMPLIANCE POINT: LOW-LEVEL OUTLET WORKS AT LAKE STERLING DAM)						
October	0.5	0.5	0.5	0.5	1	1.5
November	0.5	0.5	0.5	0.5	1	1
December	0.5	0.5	0.5	0.5	1	1
January	0.5	0.5	0.5	0.5	1	1
February	0.5	0.5	0.5	0.5	1	1
March	0.5	0.5	0.5	0.5	1	1
April	0.5	0.5	0.5	0.5	1	1
May	0.5	0.5	0.5	0.5	1	1
June	0.5	0.5	0.5	0.5	1	1.5
July	0.5	0.5	0.5	0.5	1	1.5
August	0.5	0.5	0.5	0.5	1	1.5
September	0.5	0.5	0.5	0.5	1	1.5
UNNNAMED TRIBUTARY - BELOW KIDD LAKE DAM (COMPLIANCE POINT: YB-220)						
October	0.5	0.5	0.5	0.5	0.5	0.5
November	0.5	0.5	0.5	0.5	0.5	0.5
December	0.5	0.5	0.5	0.5	0.5	0.5
January	0.5	0.5	0.5	0.5	0.5	0.5
February	0.5	0.5	0.5	0.5	0.5	0.5
March	0.5	0.5	0.5	0.5	0.5	0.5
April	0.5	0.5	0.5	0.5	0.5	0.5
May	0.5	0.5	0.5	0.5	0.5	0.5
June	0.5	0.5	0.5	0.75	1	1
July	0.5	0.5	0.5	0.5	0.5	0.5
August	0.5	0.5	0.5	0.5	0.5	0.5
September	0.5	0.5	0.5	0.5	0.5	0.5
CASCADE CREEK - BELOW LOWER PEAK LAKE DAM (COMPLIANCE POINT: YB-222)						
October	0.5	0.5	0.5	0.5	0.5	0.5
November	0.5	0.5	0.5	0.5	0.5	0.5
December	0.5	0.5	0.5	0.5	0.5	0.5
January	0.5	0.5	0.5	0.5	0.5	0.5
February	0.5	0.5	0.5	0.5	0.5	0.5
March	0.5	0.5	0.5	0.5	0.5	0.5
April	0.5	0.5	0.5	0.5	0.5	0.5
May	0.5	0.5	0.5	0.5	0.5	0.5
June	0.5	0.5	0.5	0.75	1	1
July	0.5	0.5	0.5	0.5	0.5	0.5
August	0.5	0.5	0.5	0.5	0.5	0.5
September	0.5	0.5	0.5	0.5	0.5	0.5

Table 3. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
SIXMILE CREEK - BELOW KELLY LAKE DAM (COMPLIANCE POINT: YB-226)						
October	0.2	0.2	0.2	0.5	0.5	0.5
November	0.2	0.2	0.2	0.5	0.5	0.5
December	0.2	0.2	0.2	0.5	0.5	0.5
January	0.2	0.2	0.2	0.5	0.5	0.5
February	0.2	0.2	0.2	0.5	0.5	0.5
March	0.2	0.2	0.2	0.5	0.5	0.5
April	0.2	0.2	0.2	0.5	0.5	0.5
May	0.2	0.2	0.2	0.5	0.5	0.5
June	0.2	0.2	0.2	0.5	0.5	0.5
July	0.2	0.2	0.2	0.5	0.5	0.5
August	0.2	0.2	0.2	0.5	0.5	0.5
September	0.2	0.2	0.2	0.5	0.5	0.5

Canal Outages

This measure pertains to canal outages that affect Minimum Streamflows described in this measure. For the purpose of this measure, there are three types of canal outages: 1) annual planned outages; 2) non-routine planned outages; and 3) emergency outages. For the purpose of this measure: an “annual planned outage” is defined as an outage that is typically taken around the same time each year for routine maintenance; a “non-routine planned outage” is defined as an outage for work that is high priority work (often major maintenance) and performed under planned conditions but is not performed during the annual planned outage period; and an “emergency outage” is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents.

During the Annual Meeting (Condition No. 1), Licensee will inform meeting participants about annual planned outages, including the anticipated time-frame the annual planned outages will occur, and any non-routine planned outages that are already planned at the time of the Annual Meeting, for the upcoming year. Licensee will in good faith provide CDFG, SWRCB, FS, and BLM as much notice as reasonably possible for any annual planned outages or non-routine planned outages that were not noted in the Annual Meeting or that become anticipated to occur at a time that is different than reported in the Annual Meeting or different from the approximate time of year listed in Table 2. For all annual planned outages and non-routine planned outages, Licensee will comply with the Canal Outages Fish Rescue Plan (Condition No. 30) as well as all laws and permitting requirements, as applicable. Licensee will provide CDFG, SWRCB, FS, and BLM notice by electronic mail as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after an emergency outage occurs.

Table 4 of this measure lists canals where outages may affect Minimum Streamflows in this measure and provides the Minimum Streamflows required during the first 30 days of annual planned outages, non-routine planned outages or emergency outages. If an annual planned outage, non-routine planned outage, or emergency outage is anticipated to extend past 30 days, Licensee shall consult with the CDFG, SWRCB, FS, and BLM regarding Minimum Streamflows for the remainder of the outage after the first 30 days and Licensee shall implement the collaboratively agreed upon Minimum Streamflows as soon as it is reasonably possible to do so for the remainder of the outage. Licensee shall also file any collaboratively agreed upon changes in Minimum Streamflows with the Commission. Table 4 also lists the approximate time of year and typical duration that each annual planned outage occurs. However, annual planned outages may in any given year last longer or occur outside of the approximate time frame identified in Table 4. Licensee will not take the Drum Canal and the Bear River Canal out of service simultaneously unless there is an emergency that requires this action.

Table 4. Locations where canal outages affect Minimum Streamflows.

Location	Typical historical outage period/duration	Minimum Streamflows During Annual Planned Outages, Non-Routine Planned Outages and Emergency Outages
Bear River - YB-198	Approximately 2 weeks in late September and early October (Drum Canal) or approximately 2 weeks from late March to early April (South Yuba Canal)	In the event that the total flow in the Drum Canal upstream of YB-137 and South Yuba Canal upstream of YB-139 is less than required for the Minimum Streamflow at YB-198, the Minimum Streamflow shall be no less than the natural flow in Bear River at YB-198, and Licensee shall also release as much water as is available in the two canals to meet as much of the Minimum Streamflow as set forth in this Measure as possible.
South Yuba Canal above Deer Creek Forebay - YB-34	Approximately 2 weeks in late March to early April (South Yuba Canal and/or Chalk Bluff Canal)	When the South Yuba Canal or Chalk Bluff Canal are out of service, no Minimum Streamflows shall be required at YB-34.

Fordyce Lake Drawdown

For the purposes of this measure, a “High Target Flow” is a flow of approximately 475 cfs to 250 cfs. Licensee shall make a good faith effort to manage flows released from Fordyce Dam (measured at YB-200) after spills cease at both Fordyce Dam and at Lake Spaulding, and Fordyce Dam can be safely accessed, consistent with the parameters set forth below.

- Implementation of this measure shall not cause additional spills at Lake Spaulding when transferring water from Fordyce Reservoir to Lake Spaulding;
- The end of year carryover target storage for minimum flow requirements at Fordyce Reservoir is 7,500 to 10,000 acre-feet;
- When Lake Spaulding has ceased spilling (or in a year when Lake Spaulding has not spilled) and as soon as there is sufficient storage space available in Lake Spaulding, Licensee shall begin the High Target Flow;
- Once Licensee begins the High Target Flow, Licensee shall maintain those flows until storage in Fordyce Reservoir reaches 29,000 acre-feet;
- After Fordyce Reservoir reaches 29,000 acre-feet, Licensee shall determine the subsequent release rates by calculating the difference between 29,000-acre-feet and the end of year target pool level of 7,500-10,000 acre-feet. This amount shall be apportioned equally and released until the end of year target pool level is reached;

- Licensee shall initiate a special event flow of approximately 50 cfs for approximately 10 days beginning the end of the 3rd week in August (unless FS otherwise informs Licensee of a different date); and
- Following the special event flow, Licensee shall provide no less than the flows set forth in the Minimum Streamflows in this measure.

Licensee shall make a good faith effort to provide the target flows measured as mean daily flow. The target flows set forth in this measure cannot be guaranteed and may be beyond Licensee's reasonable control. The target flows are subject to modification in emergencies. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. Licensee may increase and/or decrease flows set forth in this measure in a manner consistent with public safety and operational needs.

Spill Cessation and Minimization of Flow Fluctuations at South Yuba River

Licensee shall make a good faith effort to adhere to the Lake Spaulding spill cessation schedules in Table 5 and Table 6 of this measure if and when the following criteria occur:

- The spill flows below Lake Spaulding as measured at USGS Streamflow Gage 11414250 (YB-29) reach the flow threshold specified in Table 5 and / or Table 6, as applicable; and
- When and if the water surface elevation of Lake Spaulding as measured at USGS Reservoir Storage Gage 11414140 (Lake Spaulding near Emigrant Gap) (YB-15) meets or exceeds 5,005.6 feet (i.e., 6 feet of head on the 15-foot-high radial gates).

The spill cessation schedule in Table 5 of this measure is intended to address recreation interests in the Project (including boating) and shall apply in Wet, Above Normal, and Below Normal water years only and does not apply in Dry, Critically Dry or Extreme Critically Dry water years. The spill cessation schedule in Table 6 shall apply in all water year types. The requirements in this measure are not subject to a ramping rate.

If the above criteria and the flow threshold in Table 5 of this measure occur between May 2 and September 30, the flow schedule for the applicable Water Year Type in Table 5 will be implemented once between May 2 and September 30.

If the above criteria and the flow threshold in Table 6 of this measure are met anytime between May 2 and September 30, the Table 6 flow schedule will be implemented when reducing spill flow to a base flow (approaching the applicable Minimum Streamflow as set forth in this measure).

Licensee will use good faith efforts to implement the Target Flows in Table 5 of this measure during spill conditions and will attempt to make these flows prior to or during Memorial Day weekend each year if the above criteria occur at that time. If Licensee is in the process of implementing the Target Flows set forth in Table 5 on or after May 15, and Lake Spaulding is

not forecast to have additional or uncontrolled spill after the Table 5 Target Flows have been made, Licensee will make a good faith effort to release between 250 and 275 cfs on the last day of the spill cessation schedule for Table 5 and Licensee will then immediately begin implementing the Table 6 flows.

If there is not enough head on the radial gates to implement the full spill cessation schedule in Table 6 (i.e., Licensee cannot release the higher flows), Licensee will make a good faith effort to implement whatever portion of the spill cessation schedule in Table 6 Licensee reasonably can implement.

Table 5. Higher flow spill cessation schedule in the South Yuba River downstream of Lake Spaulding Dam.

Water Year Type:	Wet	Above Normal	Below Normal	Dry
Target Flow	Target Number of Days to Hold Target Flows			
250- 420 cfs	No less than 6 consecutive days	No less than 4 consecutive days	No less than 2 consecutive days	--

Table 6. Lower flow spill cessation schedule in the South Yuba River downstream of Lake Spaulding Dam.

Target Flow, +/- 20% ¹	Target Number of Days to Hold Target Flows
250 cfs	1 days
200 cfs	2 days
150 cfs	2 days
125 cfs	3 days
100 cfs	3 days
75 cfs	4 days
60 cfs	4 days
50 cfs ²	2 days

¹Once the facility modifications (discussed later in this measure) are completed, Target Flows at or below 75 cfs will be \pm 10%.

² If the Minimum Streamflow in this measure is greater than 50 cfs, the spill cessation will stop at the Minimum Streamflow.

Licensee shall make a good faith effort to provide the Target Flows measured as mean daily flow shown in Tables 5 and 6 above for at least the target number of days specified. However, some conditions (e.g., rain on snow event and unusual temperature variations) are outside Licensee's control, and flows may increase or decrease significantly during such conditions.

Where facility modifications are needed to provide the Target Flows in the spill cessation schedules, Licensee shall complete such modifications as soon as reasonably practicable and no later than 5 years after license issuance. Prior to making such facility modifications, Licensee will have very limited ability to make the Target Flow releases in either Table 5 or Table 6. However, Licensee shall make a good faith effort to provide the Target Flows within the limited capabilities of the existing facilities. Once Licensee has completed the needed facility modifications as discussed above, Licensee shall make a good faith effort to provide the Target Flows measured as mean daily flow within 10 percent (plus or minus) of the Target Flows at or below 75 cfs in Table 6; Target Flows above 75 cfs in Table 6 will still be subject to the 20 percent (plus or minus) variation after the facility modifications are completed.

Licensee shall make available to FS the streamflow records related to this spill cessation schedule upon FS's request.

In years where this spill cessation schedule is implemented, for the period of time from the end of the spill cessation schedule in Table 6 through September 30, with the exception of emergencies or when otherwise required by law, Licensee shall make a good faith effort to not make releases from Lake Spaulding/Spaulding Dam that result in short-term, high-flow fluctuations defined as a 100 percent or greater increase in a 12-hour period in the South Yuba River downstream of Lake Spaulding/Spaulding Dam. In non-spill cessation years, Licensee shall make a good faith effort to not make releases from Lake Spaulding/Spaulding Dam that result in short-term, high flow fluctuations as defined above in the South Yuba River downstream of Lake Spaulding/Spaulding Dam from May 2 through September 30.

These Spill Cessation Schedules cannot be guaranteed and may be beyond Licensee's reasonable control. The Spill Cessation Schedules are subject to modification if required by emergencies. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction by law enforcement, emergency services, or other regulatory agency staff, including actions to prevent imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; and public safety incidents.

South Yuba River Supplemental Flows

Licensee shall, within one year of license issuance, in coordination with FS, CDFG, State Water Board, Licensee for the Yuba-Bear Hydroelectric Project, and other interested stakeholders as identified by the FS, establish a meeting schedule with the Ecological Group (Condition No. 29, Ecological Group) for the purpose of evaluating the monitoring data as collected pursuant to Licensee's Monitoring Plan as approved by the Commission for the South Yuba River, including the data related to foothill yellow-legged frogs (FYLF) and resident rainbow trout, and assessing the effect of any Supplemental Flows, if applicable, on habitat, including water temperatures, for FYLF and native fish species (e.g., resident trout, hardhead, pikeminnow). Consistent with the approved Monitoring Plan, Licensee will collect data regarding FYLF and fish populations, including rainbow trout, in the South Yuba River below Lake Spaulding and will provide those data to the Ecological Group on an annual basis (no later than January 31 of each year, for the previous year's data), if applicable, during the term of the license. Water temperature monitoring data will be provided to the Ecological Group every two weeks from June 1 through August 15 unless otherwise agreed to. For the first 5 years after license issuance, or until the low-level outlet at Lake Spaulding Dam is retrofitted, whichever is sooner, Licensee will make a good faith effort to meet Supplemental Flows in the South Yuba River below Lake Spaulding as measured at YB-29.

For the purposes of this measure, Supplemental Flows mean water Licensee may be required to release in addition to the Minimum Streamflows into South Yuba River below Lake Spaulding annually between July 1 and September 15 in CD, Dry, and BN water year types so that the total minimum flow (i.e., the Minimum Streamflows plus Supplemental Flows) as measured at

YB-29 shall be no greater than 30 cfs. The purpose of the Supplemental Flows, coupled with the minimum streamflows, is to create and enhance habitat for resident rainbow trout without decreasing habitat or otherwise negatively impacting FYLF or other native species, such as hardhead.

The Ecological Group will be responsible for providing annual recommendations to FS, and FS shall then determine, whether in CD, Dry, and BN water year types any Supplemental Flows shall be implemented each year. If FS determines that any Supplemental Flows will be implemented during any year of the license term, FS shall inform Licensee of that determination in writing (electronic communications acceptable) no later than June 1 of the same calendar year for which the Supplemental Flows shall be implemented and shall inform Licensee of the requested total minimum flow (e.g., the monthly number between the Minimum Streamflows and a maximum of 30 cfs) for each month between July 1 and September 15. With reasonable notice (10 days), FS may request one adjustment to these flows during this time period. Table 7 provides the monthly Supplemental Flow range and the total minimum flow range for the South Yuba River as measured at YB-29 in CD, Dry, and BN water year types. Although Supplemental Flows do not apply to the month of June, Minimum Streamflows for June are included in Table 7 to provide a reference for the time period immediately preceding the period when Supplemental Flows may be implemented.

Table 7. Minimum Streamflows in South Yuba River below Lake Spaulding Dam as Measured at YB-29 with Supplemental Flow Range and Total Minimum Flow Range

Period	Minimum Streamflow (cfs)	Supplemental Flow Range (cfs)	Total Minimum Flow Range (cfs)
CRITICALLY DRY WATER YEARS			
June 15 - 30	35	--	35
July	25	0-5	25-30
August	20	0-10	20-30
September 1 - 15	20	0-10	20-30
DRY WATER YEARS			
June 15 - 30	40	--	40
July	30	--	30
August	23	0-7	23-30
September 1 - 15	23	0-7	23-30
BELOW NORMAL WATER YEARS			
June 15 - 30	50	--	50
July	35	--	35
August	25	0-5	25-30
September 1 - 15	25	0-5	25-30

If the FS does not inform Licensee by June 1 that it wants to implement Supplemental Flows in the South Yuba River for that calendar year, Licensee shall implement the Minimum Streamflows for the South Yuba River as set forth in the Streamflows Measure. Nothing in this measure shall require Licensee to release flows above 30 cfs in CD, Dry, and BN water year types, or allow the Licensee to release flows in the South Yuba River that are lower than the Minimum Streamflows, as measured at YB-29 as set forth in the Streamflows Measure.

The Ecological Group will also be responsible for providing annual recommendations to FS, and FS shall then determine, whether in AN and Wet water year types the Minimum Streamflows for the South Yuba River as measured at YB-29 should be decreased between July 1 and September 15 to no less than 30 cfs, as approved by FERC. If FS determines that any Minimum

Streamflow should be decreased in Above Normal and Wet water years as described in this paragraph, FS shall inform Licensee of that determination in writing no later than June 1 of the same calendar year for which the decreased Minimum Streamflow is to be implemented and Licensee shall implement the decreased Minimum Streamflow as approved by FERC. FS shall not require Licensee to implement more than one Minimum Streamflow in a calendar month (i.e., the FS will only provide one Minimum Streamflow for each month from July 1 through September 15). If FS does not inform Licensee by June 1 that it wants to decrease the Minimum Streamflows in the South Yuba River in an AN or Wet water year as described in this paragraph, Licensee shall implement the Minimum Streamflows for the South Yuba River as set forth in the Streamflows Measure. Nothing in this measure shall require Licensee to release flows above the Minimum Streamflows in the South Yuba River as measured at YB-29 in Above Normal or Wet water years as set forth in the Streamflows Measure.

If, after at least three years of monitoring (including at least one Dry or CD water year), data indicate that daily average water temperatures immediately above Canyon Creek are exceeding 20°C mean daily, an important transition temperature for rainbow trout and other native species, for two consecutive days, FS may require that the Licensee develop a plan to amend this South Yuba River Flow Adjustment Measure for the South Yuba River above Canyon Creek. This plan, if required, will describe methods for providing flows below Lake Spaulding from July 1 through September 15 to quickly reduce water temperatures if they exceed 20°C for two consecutive days (daily average, measured as close to Canyon Creek as reasonably possible). The plan shall be filed with FERC within two years of the request by the FS and shall include empirical data from at least one dry or critically dry water year type. The plan will develop recommendations to meet the rainbow trout water temperature objective without negatively impacting, as determined by FS, FYLF and other native species. The plan shall be based on stream temperature monitoring and existing modeling of the affected reach from immediately below Lake Spaulding Dam downstream to Canyon Creek. The plan shall also propose empirically determined ramping rates and Total Minimum Flows not to exceed 40 cfs that will avoid negative effects to FYLF and other native species within this reach. The plan will also consider potential impacts to generation and water supply. Licensee shall submit the plan for FS approval prior to submission to the Commission. Licensee shall implement the plan upon Commission approval.

Licensee shall provide to FS, CDFG, State Water Board, interested stakeholders, and the Commission by no later than the Annual Consultation meeting of the next calendar year a report of the activities of the Ecological Group for the previous calendar year.

Ecological Group

Licensee shall, within 3 months of license issuance, in coordination with FS, BLM, CDFG, State Water Board, and other interested stakeholders, establish an Ecological Group for the purpose of assisting Licensee in the implementation of project-wide monitoring plans and review and evaluation of monitoring data. The Ecological Group will also provide guidance on implementation of the South Yuba River Flow Adjustment Condition (Condition No. 29).

Licensee shall provide to FS, BLM, CDFG, State Water Board, interested stakeholders, and the Commission by June 30 of each year an annual report of the activities of the Ecological Group.

Condition No. 30 – Canal Outages Fish Rescue Plan

A Canal Outages Fish Rescue Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 31 – Gaging Plan

A Gaging Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 32 - Modifications of 4(e) Conditions in the Event of Anadromous Fish Re-introduction

FS reserves the right to modify these conditions to respond to any reintroduction of Chinook salmon or steelhead trout listed under the Endangered Species Act to stream reaches through NFS lands where the flow is controlled by this Commission licensed facility.

Condition No. 33– Aquatic Invasive Species Management

Licensee shall, within 1 year after license issuance, file with the Commission a plan approved by FS to address invasive species such as the New Zealand mudsnail (*Potamopyrgus antipodarum*), Quagga mussels (*Dreissena bugensis*), and zebra mussels (*Dreissena polymorpha*) if they are found during any monitoring.

Invasive algae (*Didymosphenia geminata*) was found throughout the Project area. If future studies document a safe method of reducing this invasive algae in rivers, Licensee may be asked to implement this task in Project-related locations.

Licensee shall implement the following AIS Best Management Practices (BMP) prevention within the FERC Project Boundary at Project reservoirs:

- Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:
 - Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site.
 - Removing visible plants, animals and mud from boat before leaving waterbody.
 - Cleaning and drying boats using California Department of Fish and Game (CDFG) accepted protocols for the prevention of all AIS before entering any waterbody area

- Disposing of unwanted bait in trash, including earthworms.
- Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody.
- Preventing spread of invasive species like amphibian chytrid fungus.
- If any reservoir access sites become infested with AIS, Licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.
- In accordance with California Assembly Bill 2065 (2008) (enacted as FGC §2302), Project reservoirs will be assessed for their vulnerability to the introduction of nonnative dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.

Condition No. 34 – Terrestrial Protection Measures

Vegetation and Non-Native Invasive Plant Management Plan

A Vegetation and Integrated Pest Management Plan was provided in the Final License Application. Licensee will, within 1 year of license issuance, complete, in consultation with FS, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, and approved by FS, a single Vegetation and Non-Native Invasive Plant Management (NNIP) Management Plan (Plan) for all NFS lands and BLM administered lands potentially affected by the Project. Targeted NNIP will be those species defined by the California Department of Food and Agriculture (CDFA) code, the California Invasive Plant Council (Cal-IPC) rating system, or as FS or BLM species of concern.

The Plan will address special status species, terrestrial NNIP species, and revegetation within the Project boundary and adjacent to Project features directly affecting NFS and BLM lands including Project and project related roads, facilities, and distribution and transmission lines.

Minimum components of the Plan shall include, but may not be limited to:

- Special status species management: protection, monitoring, frequency of surveys, internal education, reporting, and adaptive management.
- Sensitive area protection, including guidelines for conducting activities that reduce the effects to sensitive resources.
- Non-native invasive plant (NNIP) species management: frequency of surveys, guidelines for prevention, treatment, internal education, monitoring, reporting, guidelines for conducting weed risk assessment for new project feature development, including an adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.
- Methods that ensure early detection and treatment of NNIP.
- Guidelines for treatment of NNIP populations on Federal lands within the FERC Project boundary. In areas where NNIP populations that are determined to be project-related extend outside the FERC Project boundary, treatments would extend up to 1½ mile beyond the FERC Project boundary. If noxious weed populations extend more than 1½ mile from the FERC Project Boundary, and are determined to be Project-related, Licensee will consult

with FS or BLM to determine if the populations should be treated and, if so, the appropriate treatment methods. The same treatments are recommended on Licensee lands.

- Guidelines for conducting Licensee's inspections of equipment and vehicle for NNIPs.
- List of target NN IPs agreed to and approved by BLM and FS.
- Revegetation implementation and monitoring.
- Treatment protocols for vegetation management, hazardous fuels reduction, and hazard tree management for protection of Project facilities and Project-affected resources within the Project affected area.
- Pesticide/herbicide use approval and restrictions.
- Annual reporting guidelines for the Annual Meeting.

Licensee, in consultation with FS and BLM, will review, update, and/or revise the Plan if substantial changes in vegetation management occur. Changes may be implemented if monitoring feedback indicates that resource objectives are not being met.

Any updates to the Plan would be prepared in coordination and consultation with FS and BLM. A minimum of 60 days would be allowed for FS and BLM to comment and make recommendations before Licensee files the updated plan with the Commission. Any changes to the Plan shall be approved by FS and BLM. Licensee would include all relevant documentation of coordination/consultation with the updated Plan filed with the Commission.

Monitor Animal Losses in Project Canals

Beginning in the first full calendar year after license issuance, Licensee shall record animal losses in all Project canals. Specifically, Licensee's operators shall record in log books all dead animals observed on canal trash racks and otherwise in the canals using the Wildlife Mortality data sheets found in Appendix 4-2A of the Wildlife Movement Technical Memorandum (4-2) included in Appendix E12 of Licensee's application for new license. Licensee shall make a good faith effort to record the location of the dead animal (i.e. which Project canal, where in the canal the dead animal was found, and the associated structure), species, date and time of the observation, suspected cause of death if it can be determined from visual observation only, photograph if available, estimated size, estimated age, and sex if known, and other pertinent information. The information will include the cumulative years and preceding year's mortality by canal segment, and a map showing segments (defined by location of trash racks). Licensee shall provide this information to CDFG, FS, and BLM at least 60 days prior to the Annual Meeting described in Condition No. 1.

Licensee shall consult with FS, BLM, and CDFG and other interested parties during the Annual Meeting, regarding the protection and utilization of the wildlife resources affected by the Project. If there is an increasing trend in animal mortalities in a canal, additional measures to address suspected Project-related causes for that canal may be developed by Licensee in consultation with CDFG, FS, and BLM. The Licensee shall prepare a report that includes the Licensee's recommendations for measures to address animal mortalities, and a schedule of implementation. Licensee shall provide the report to FS, BLM, and CDFG, as appropriate, for review and approval. The Licensee shall file the report, including evidence of consultation, with

the Commission, and shall implement those resource management measures required by the Commission.

Replacement of Wildlife Escape and Wildlife Crossing Facilities

Prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along Project canals, Licensee shall consult with CDFG regarding specifications and design and with FS, as appropriate. Licensee shall file the design, including evidence of consultation, with the Commission within 60 days after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Licensee shall also assess existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order. Inspections shall occur at the same time other types of maintenance activities or canal assessments are being conducted.

Wildlife Crossings—Drum, South Yuba, and Towle Canals

Within 1 year of license issuance, Licensee shall complete, approved by FS, BLM, and CDFG, a Wildlife Crossing Plan for placing wildlife crossings across the following segments of conduits listed in the table below (Crossings numbers cross-reference to GPSID metadata to Technical Memo 4-2 Wildlife Movement):

Table 7. General Location of Crossing on NFS Land by Legal Location

Canal/Conduit	GPSID*	FS Reference Point Defining Segment*	Estimated barrier length	Number of Crossings	Legal
South Yuba/Towle Canals	YDWMYC004 To YDWMYC026	93 to 167	7 miles	2	Sec. 35, T17N, R1 1E
				1	Sec. 4, T16N, R11E
South Yuba	YDWMYC061 To YDWMYC045	98 to 138	1.5 miles	1	Sec. 33, T17N, R11E
South Yuba	YDWMYC139 To YDWMYC 146	124 to 128	1.5 miles	1	Sec. 36, T17N, R10E
*Points cross-reference to crossing GPSID in metadata to Technical Memo 4-2 Wildlife Movement.					

Unless otherwise agreed to by FS, BLM, and CDFG, crossing structures shall maximize the continuity of native soils adjacent to and on the wildlife crossing and meet the following minimum specifications: (1) Overcrossing shall be a minimum of 12 feet wide, with fenced 8-foot high side railings, and access ramps less than 30 percent grade; or (2) Undercrossing shall be a minimum of 10 feet high by 10 feet wide (with 2-foot width of dry path above the high water mark if a perennial stream) with natural substrate. Upon agreement by FS, BLM, and CDFG, Licensee may retrofit or redesign existing features. The Plan will include an implementation schedule, with implementation

beginning two years from license issuance and completion within five years, unless otherwise agreed to by FS, BLM, and CDFG.

Structures shall be identified as Licensee-maintained wildlife crossings and georeferenced in a map and provided to FS, BLM, and CDFG. Licensee shall annually monitor and report crossing condition, and maintenance and repair activities.

Minimum components of the Plan shall include, but may not be limited to:

- Locations for planned and existing Licensee-maintained wildlife crossings, to provide movement approximately every 0.75 mile in combination with natural landscape features that also meet the above specifications
- Overpass or underpass design
- Map of all conduits, with segments identified by canal mile
- Map of all crossing structures, wildlife escape ramps and flashers with corresponding GPS coordinates
- Implementation schedule
- Annual monitoring and reporting of crossing condition, maintenance and repair activities
- Providing passage across canals on PG&E-owned land that bisects the Tahoe National Forest, as described in the following table:

Table 8. General Location of Crossing on Licensee Land by Legal Location

Canal/Conduit	GPSID*	FS Reference Points defining segment*	Estimated barrier length	Number of crossings on PG&E owned land
Drum Canal	YDWMDC023 To	71 to 77	4 miles	6
Drum Canal	YDWMDC009 To	11 to 13	1.8 miles	1
Drum Forebay to Drum Powerhouse penstock	none	none	1 mile	1
South Yuba/Towle Canal	YDWMYC004 To	93 to 167	7 miles	3
*Points cross-reference to crossing GPSID in metadata to Technical Memo 4-2 Wildlife Movement.				

Wildlife Crossings—Bear and South Canals

Within 1 year of license issuance, Licensee shall complete, approved by FS, BLM, and CDFG, a Wildlife Crossing Plan for placing wildlife crossings for the Bear and South Canals that is integrated with wildlife escape structures and exclusion fencing to reduce wildlife mortality.

Unless otherwise agreed to by FS, BLM, and CDFG, crossing structures shall maximize the continuity of native soils adjacent to and on the wildlife crossing and meet the following minimum specifications: (1) Overcrossing shall be a minimum of 12 feet wide with fenced 8-foot-high side railings, and access ramps less than 30 percent grade; or (2) Undercrossing shall be a minimum of 10 feet high by 10 feet wide (with 2-foot width of dry path above the high water mark if a perennial stream) with natural substrate. Upon agreement by FS, BLM, and CDFG, Licensee may retrofit or redesign existing features. The Plan will include an implementation schedule, with implementation beginning two years from license issuance, and completion within five years, unless otherwise agreed to by FS, BLM, and CDFG. Minimum components of the Plan include, but may not be limited to:

- Locations for planned and existing Licensee-maintained wildlife crossings, to provide movement approximately every 0.75 mile in combination with natural landscape features that also meet the above specifications
- Overpass or underpass design
- Map of all conduits, with segments identified by canal mile
- Map of all crossing structures, wildlife escape ramps and flashers with corresponding GPS coordinates
- Implementation schedule
- Annual monitoring and reporting of crossing condition, maintenance and repair activities

Bald Eagle Management Plan

A Bald Eagle Management Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Special Status Species

Before taking actions to construct new project features on NFS lands that may affect FS special status species or their critical habitat on NFS land, Licensee shall prepare and submit a biological evaluation (BE) for FS approval. The BE shall evaluate the potential impact of the action on the species or its habitat. FS may require mitigation measures for the protection of the affected species on NFS land.

The BE shall:

- Include procedures to minimize or avoid adverse effects to special status species.

- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land

Licensee shall, beginning the first full calendar year after license issuance, in consultation with FS annually review the current lists of special status species (species that are Federally Endangered or Threatened, Proposed Threatened or Endangered, FS Sensitive, or Tahoe National Forest Watch Lists, State Threatened or Endangered, State Species of Special Concern, and CDFG Fully Protected) that might occur on National Forest System lands, as appropriate, in the Project area that may be directly affected by Project operations. When a species is added to one or more of the lists, FS, , in consultation with Licensee shall determine if the species or un-surveyed suitable habitat for the species is likely to occur on such NFS lands, as appropriate. For such newly added species, if FS determines that the species is likely to occur on such NFS lands, Licensee shall develop and implement a study plan in consultation with FS to reasonably assess the effects of the project on the species. Licensee shall prepare a report on the study including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to FS for review and approval. Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

If new occurrences of FS special status plant or wildlife species as defined above are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, Licensee shall immediately notify FS. If FS determines that the Project-related activities are adversely affecting FS sensitive or watch list species, Licensee shall, in consultation with FS, develop and implement appropriate protection measures.

If new occurrences of state or federally listed or proposed threatened or endangered species are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, Licensee shall immediately notify FS and the relevant Service Agency (United States Fish and Wildlife Service or National Marine Fisheries Service or CDFG) for consultation or conference in accordance with the Endangered Species Act. If state listed or fully protected species are affected, CDFG shall be notified.

Project Powerlines

Raptor-safe powerline design configurations described in Avian Protection on Powerline Interaction Committee's (APLIC) "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (APLIC 2006), or the most current edition of this APLIC document, will be used for all new powerlines or when replacement of existing poles, phase conductors, and associated equipment is required.

If raptor monitoring performed as Condition No. 34 (Terrestrial Protection Measures, Raptor Collisions) indicates a substantial raptor-Project transmission line interaction issue, the poles

where the interaction issue occurs on NFS Land will be replaced or retrofitted, as agreed to via consultation with FWS, FS, and CDFG.

Raptor Collisions

Licensee shall, beginning in the first full calendar year after license issuance, record annually all incidental observations by Licensee's operations staff of bird collisions/electrocutions at the Bowman-Spaulding Transmission Line. The reported incidental observations shall include the following information: 1) date of observation; 2) location of observation (i.e., nearest pole number); 3) species, if identifiable; 4) number of birds; 5) condition of bird(s) (i.e., dead or injured); 6) suspected cause of injury or death (i.e., electrocution or collision); and 7) was the bird banded and, if so, band number. Licensee shall provide this information for each year to FS, FWS, and CDFG at least 60 days prior to the Annual Meeting (Condition No. 1).

Bat Management

In the first full calendar year after license issuance, Licensee shall document all known bat roosts within Project buildings (e.g., powerhouses, storage buildings, valve houses), dams, or other structures that may be used as a roosting structure. The results of the inspection will be provided to CDFG and FS if the facility is located on NFS lands, at least 90 days prior to the Annual Meeting (described in Condition No. 1) that follows collection of the information. If bats or signs of roosting are present where staff have a routine presence (i.e., at least daily or weekly), Licensee will attempt, where feasible, and in the calendar year following the Annual Meeting described above, to place humane exclusion devices to prevent occupation of the structure by bats. Humane exclusion devices will be placed when bats are absent from the facility, generally between November 1 and February 28. Prior to installation of the humane exclusion devices, Licensee shall perform an inspection of the facility to ensure that overwintering bats are not trapped. If overwintering bats are present during the inspection, installation of humane exclusion measures shall be delayed. Licensee shall notify FS of the overwintering bats. Licensee shall consult with the CDFG, FS, or BLM during the Annual Meeting described in Condition No. 1 to identify future dates that would be suitable for installation of humane exclusion devices. All exclusion devices will be inspected on an annual basis and the facility will be reevaluated for roosting bats every 3 years after the initial exclusion devices are installed to insure that no new roosts or entry points have been established.

Bear River Management Plan in Bear River Above Drum Afterbay on National Forest System Lands

Licensee shall develop a plan to assess riparian vegetation and bank stability conditions on National Forest System lands in Bear River above Drum Afterbay at locations approved by FS (Plan). The Plan shall be submitted to FS for approval within 1 year of license issuance and shall be implemented by Licensee upon FERC's approval. The Plan shall include the following components:

Baseline Monitoring

- Develop stage-discharge relationships for the Bear River stream channel at target sites in the Bear River to correlate flow releases from project facilities to flows at the target sites. This may include development of a HEC-RAS model or other appropriate models to model flows through the stream channel. Classify stream bank stratigraphy and plot on cross sections (Stage-Q) to correlate flow levels, flow volume, and erosive areas in the stream bank. Also conduct longitudinal profile characterization (thalweg elevations).
- Conduct an analysis that characterizes sediment distribution and morphology. This analysis will include characterization of the channel conditions both in the types of substrate present and the condition of the active channel and overbank areas.
- Generate a qualitative bank stability erosion analysis to determine sensitive areas and those most susceptible to erosion.

Ongoing Monitoring

- Qualitative monitoring (visual and photograph monitoring) of erosion prone areas within NFS lands through monitoring stream banks for sloughing, fissures that may lead to sloughing, uprooted trees, slides and nicks to the banks.
- Establishment of up to five channel cross-sections with monumented pins to enable measurements and changes over time.
- For the first 5 years, an annual and event-triggered (flows greater than 400 cfs at YB-198) survey of sediment distribution and morphology with comparison to baseline monitoring.
- After the first 5 years, surveys will occur every 3 years and following event- triggered flows, unless FS informs Licensee at the Annual Consultation Meeting each year that an annual survey is still necessary. Event triggered flow levels will be determined collaboratively by the FS and Licensee, but will not be less than 400cfs at YB-198.

Report and Recommendations

For the first five years following the year the Plan is approved by the Commission, and each year thereafter during which monitoring has occurred, Licensee shall prepare a report summarizing the monitoring results from the previous calendar year, which shall be provided to FS at the Annual Consultation meeting with FS. Based on the results of baseline monitoring, the report will include Licensee's preliminary recommendations to address Project-related adverse effects, if any, on National Forest System lands along the Bear River above Drum Afterbay. Licensee and FS shall collaborate regarding such preliminary recommendations, if any, and Licensee shall submit to the Commission the final recommendations, as approved by FS. Licensee shall implement such recommendations as approved by the Commission. Any recommendation that results from the monitoring referenced above shall include evaluation of economic effects on power generation and potential impacts to water supply. Recommendations may include revegetation and/or other physical remedial actions and may also include flow-related alternatives, if appropriate, to protect or mitigate Project-related adverse effects. Any recommendation shall include the following language regarding Emergencies:

““Emergencies

Any flow limitations that may be required by FS do not apply in emergencies. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life, or damage to property, or loss of water supply delivery infrastructure. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. During emergencies any Drum Canal spillway may be used without restriction.”

In addition, any recommendation approved by FS and submitted to the Commission for approval that is related to flows shall avoid limiting downstream consumptive water deliveries during outages. An outage is defined as routine or non-routine (scheduled or unscheduled) events that are required to maintain or repair Project infrastructure such as canals or powerhouses that are not defined as Emergencies.

Condition No. 35 – Monitoring Program

Licensee shall implement a Monitoring Program after license issuance and through the term of the new license and any annual licenses, in coordination with FS, BLM, CDFG, and State Water Board. An overview with the primary elements of the monitoring program is provided below. These concepts have been presented to Licensee and initial discussions on details of the monitoring plan (e.g., numbers of sites per reach, years to monitor, field methods) have occurred. However, no specifics have been agreed to as of this filing. The Monitoring Program has been designed to monitor those items that are considered to be essential for determining if the resource objectives described in the Rationale Report are being met. Within the scope of the specified Monitoring Program, FS, BLM, CDFG, and State Water Board may select an equal number of alternative years to ensure that surveys occur during a range of water year types. Final study plans for each element of the Monitoring Program shall be approved by FS prior to implementation of the program. FS, CDFG, BLM, and State Water Board have the flexibility to alter the Monitoring Program methodologies and frequencies of data collection if it is determined that: (a) there is a more appropriate or preferable methodology or site to use than that described in the monitoring plan or (b) monitoring may be reduced or terminated because the relevant ecological resource objective has been met or no change in resource response is expected.

Licensee shall file with the Commission by June 30 of each year an Annual Report fully describing the monitoring efforts of the previous calendar year as well as a report documenting all deviations from the license conditions. FS, CDFG, BLM, and State Water Board shall have at least 30 days to review and comment on the draft report prior to filing with the Commission. Comments shall be addressed in the final report, or as appropriate, comments shall be included with the filing to Commission. Licensee shall provide copies of the annual report to FS, CDFG, BLM, and State Water Board. Every 5 years, Licensee shall provide a summary report of the

monitoring results of the previous 5-year period, including any recommendations to address monitoring results, and provide to FS, CDFG, BLM, and State Water Board.

The following guidelines shall be used in implementing the monitoring program: (a) monitoring and studies shall be relevant to the Project, (b) monitoring and studies shall be conducted such that they provide useful information for management decisions or establishing compliance with license conditions, and (c) monitoring and studies shall be as cost-effective as possible. Funding for performing the monitoring, as well as specified contingency funding, shall be provided by Licensee.

For purposes of the Monitoring Program, each year is defined on a calendar year basis (i.e., January through December). This monitoring program covers monitoring to be conducted during all years until a new license is issued. Most monitoring described below is estimated to end after 30 years; however, if a new license is not issued within 30 years, FS, BLM, CDFG, and/or State Water Board reserve the right to extend the monitoring period as necessary.

The following is an overview of the aquatic monitoring program.

Large Stream and Riverine Aquatic Species

Streamflow conditions throughout the DS project will change as a result of the new license. Aquatic species may respond either positively or negatively to changes in timing, magnitude, and duration of streamflows. These streamflow changes will also lead to water temperature changes. Monitoring of aquatic species is proposed to allow assessment of their responses to streamflows and water temperatures and to take appropriate management actions as necessary.

Reaches

Large stream reaches include South Yuba River, Bear River, North Fork of the North Fork of the American, and Canyon Creek (below Towle Canal).

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on the distribution and abundance of special status, native, and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions. The following are focal species/species groups.

- rainbow trout (RBT) and other native fish species of interest
- foothill yellow-legged frogs (FYLF)
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)
- aquatic invasive species (e.g., *Didymosphenia geminata*)

Number of Sites and Frequency of Monitoring

Monitor one to four survey sites (depending on reach length and configuration) within each stream reach that each species or species group is currently known to occur (based on relicensing studies and other recent survey records). For FYLF and RBT, periodically expand the survey area for the most upstream and/or most downstream sites in each reach to determine if the distributions of these species are shifting over the course of the license.

A combination of annual and periodic monitoring is proposed. Generally, a higher frequency of monitoring shall be done immediately following license implementation, lower frequency in the middle of the license period, and higher frequency again immediately prior to the filing of the NOI/PAD for the next relicensing. For FYLF, RBT, and BMI conduct annual surveys on a subset of sites for the first 10 years following implementation of new license conditions. After 10 years, Licensees will consult with resource agencies to determine if annual monitoring should continue.

Distribution and Population Metrics

Sampling effort should be sufficient to derive quantitative, repeatable, and reliable metrics of the lifestage periodicity/phenology, distribution, relative abundance, and condition (as appropriate) of each species/species group within each reach and throughout the project-affected area.

Example lifestage periodicity metrics:

- date range of FYLF breeding/egg mass deposition
- date range of RBT and other fish spawning and fry emergence

Example distribution metrics:

- # or proportion of sites occupied within stream reach
- # or proportion of sites occupied throughout all reaches

Example relative abundance metrics:

- # of FYLF egg masses per mile (or kilometer)
- # of FYLF by lifestage, stream distance or area surveyed
- # of WPT per survey time
- # of RBT by lifestage, per mile

Example condition metrics:

- RBT/other fish pounds per acre
- BMI diversity, biomass, sensitivity metrics

Special Purpose Monitoring

Conduct quantitative monitoring of fish populations in key large river reaches following extreme critical dry years.

Smaller Upper Elevation Streams – Aquatic Species

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on special status and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions.

Focal species:

- rainbow trout (RBT) and other fish species of interest
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)

Number of Sites and Frequency of Monitoring

Monitor small streams on a rotating basis every five to ten years.

Habitat and Environmental Conditions

Streamflow conditions throughout the DSYB projects will change as a result of the new license. These streamflow changes will also lead to water temperature changes. Monitoring of streamflow and water temperature is proposed to document compliance with minimum instream flow conditions and ramping/spill recession rates and to allow assessment of aquatic species responses to streamflows and water temperatures. Monitoring of geomorphology, riparian, stream substrate and woody material conditions are proposed to

Habitat and Environmental Conditions to Monitor

- streamflow/discharge (cfs) and stage monitoring
- water temperature
- channel morphology/riparian condition
- stream substrate and woody material conditions
- water quality and mercury bioaccumulation

Number of Sites and Frequency of Monitoring

- Streamflow/stage change and water temperature - Distribute data collection sites for streamflow and water temperature so that they will inform aquatic species monitoring. Collect 15 min and/or daily data each year. Provide real-time data for reaches/locations of interest (to be determined).

- Channel morphology/riparian, water quality/mercury bioaccumulation, stream substrate/woody material conditions – Conduct periodic monitoring of these habitat elements in reaches/locations of interest. For channel morphology and woody material, key reaches include: Bear River reach #2 (meadow and below Boardman Canal), Bear River below Rollins Reservoir and Bear River Diversion Dam, Middle Yuba below Milton, North Fork of the North Fork American, Meadow Lake, Clear and Trap Creeks (related to channel stabilization plan).

Reporting

Summarize aquatic species monitoring data in annual monitoring reports that include, at a minimum, information on survey effort and timing, maps of species distributions, quantitative descriptions of species' distribution and relative abundance, and relationships (via graphing and other analyses) of species distribution/abundance to streamflow and water temperature conditions. Provide data to agencies and other interested parties electronically in spreadsheets (e.g., Excel) and spatial formats (e.g., GIS shapefiles). All electronic data should be linkable by a unique survey site and year identifier.

Summarize streamflow and water temperature data in annual reports and provide data to resource agencies in electronic format, preferably in HEC-DSSVue, or Excel. Summarize other environmental and habitat data in annual reports and provide data electronically to resource agencies.

After the first 5 years, the first 10 years, and at the end of each decade thereafter through the end of the license period, compile a summary report comparing survey information from the previous survey period(s).

Other resource areas that will be included in the overall monitoring plan are:

Non-Native Invasive Species Monitoring and Sensitive Plant Monitoring

Monitoring associated with non-native invasive species and sensitive plants will be described in the Integrated Vegetation and Non-Native Invasive Species Management Plan.

Recreation Monitoring

Monitoring associated with recreation are described in the Recreation measures.

Cultural Resource Monitoring

Monitoring associated with cultural resources will be described in the Historic Properties Management Plan.

Bear Management Monitoring

Monitoring associated with bear management (need for food locker) is described in the Recreation measures.

Wildlife Crossing Placement and Effectiveness

Ten years following license issuance, and every ten years thereafter, Licensee shall arrange a meeting with FS, BLM, and CDFG, to review the location and design of Licensee-maintained crossings and natural landscape features that provide wildlife passage across Licensee's conduits, in context with changes in land use patterns, human development, and road improvements or decommissioning, that may affect wildlife use of crossings. As identified by FS, BLM, and CDFG, Licensee will develop additional plans to address additional needs for crossings, exclosures, and escape structures, to be submitted to the Commission for approval.

Sensitive Raptor Monitoring

This monitoring is specifically directed towards annual planned outages and non-routine planned outages as defined in Condition No. 29 along the South Yuba Canal. Licensee will record Licensee's activities that may generate noise disturbances (i.e. operate machine-powered equipment, vehicles off of public access roads, construction, maintenance and repairs to the canal) that occur between February 15 through September 15 within 0.25 miles of California spotted owl and northern goshawk Protected Activity Centers (PACs), and within suitable habitat for these species. The information will include a general description of the type of activity, its approximate duration, the location of activities, and spatially displayed in proximity to the PAC and suitable habitat. This information will be submitted to FS and CDFG at least 60 days prior to the Annual Meeting, and reviewed at the Annual Meeting. If, after the first 3 years of reporting, noise disturbances have the potential to disrupt more than two territories annually (or two nests, if nest locations are known within the territory), Licensee shall, in consultation with FS, prepare a survey plan for conducting surveys to protocol, with the purpose of identifying nest locations that may occur within 0.25 miles of the South Yuba Canal, to be approved by FS. The survey plan will include: (1) maps showing the habitat to be surveyed, the canal, access roads and trails, and other identifiable topographic features, (2) the most recent compilation of species sighting data that is available from FS and the State of California (CNDDDB), and (3) reporting format for results. Licensee shall initiate surveys within two years following the Annual Meeting where the need is identified, or as otherwise agreed to by FS. Ongoing monitoring of noise-generating activities that occur within the breeding season will continue to inform the need for updating surveys for these species and/or confirming the location of nest sites every 5 years. Licensee shall propose potential mitigations, where practical, to further reduce disturbances in proximity to nests, to be discussed and agreed upon, at the Annual Meeting.

Condition No. 36 – Large Woody Debris

Within 1 year of license issuance, Licensee shall, in consultation with FS, BLM, CDFG, and State Water Board, prepare a Large Woody Debris (LWD) Management Plan approved by FS. The Plan will specify:

- Describe existing locations of LWD collection by Project facilities.
- Describe potential options for moving LWD below Project facilities and keeping the LWD within the river corridor.
- Identify suitable locations where LWD can be placed within the active channel to be mobilized by 2- to 5-year high flow events.

Upon Commission approval, Licensee shall implement the Plan.

Condition No. 37 - Recreation Survey, Monitoring, and Future Development Triggers

Survey and Monitoring

Licensee shall conduct recreation survey and monitoring as follows:

- Licensee shall conduct recreation monitoring on NFS land once every 6 years that will include evaluation of resource impacts from developed and dispersed use, including evidence of garbage and human waste left on site. FS shall be involved in the evaluation of resource impacts on NFS lands.
- Licensee shall conduct occupancy surveys of project facilities on NFS land on a 3- and/or 6-year cycle as described in the DSYB Recreation Trigger Plan (Attachment 1).
- Licensee shall conduct a Recreational User Survey (questionnaire) on NFS land once every 12 years starting from license issuance. The first visitor survey will be conducted in the first Form 80 reporting year/schedule following license issuance. Survey methods and questions shall be reviewed and approved by the FS in advance. The Recreation User Survey shall be focused to address the key issues at the time. Survey information shall be reviewed by the FS.
- At 6 and 12 years after license issuance, Licensee shall prepare the Recreation Monitoring and Survey Report and shall be provided to FS for review, comment, and approval prior to filing with the Commission. Both the 6 and 12 year Recreation Monitoring and Survey Reports shall incorporate: data from the information listed above; traffic counters (see Condition No. 44, Transportation System Plan regarding traffic counters installation, monitoring and reporting); other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, and Project Patrol reports that are available to Licensee when it prepares the Recreation Survey and Monitoring Reports occupancy rates; and other applicable information.
- Licensee shall file a Recreation Resources Report in compliance with the regulations at 18 CFR section 8.11, or as amended.

The 6-Year Recreation and Survey Monitoring Reports shall address, at a minimum, the following factors:

- Occupancy and capacity information.
- Summarize monitoring results in relation to established triggers and address any changes in trends (including changes in peak season) since previous reports (or initially from relicensing studies).
- User and resource conflicts.

- Outstanding health and safety issues.
- Known bear encounters at sites without food lockers.
- A 6-year schedule for maintenance, rehabilitation, reconstruction and new construction.
- Proposed facility changes based on any mandated updated guidelines, such as ADA and FSORAG.
- New or modified management actions (increased patrols, additional sanitation facilities, closure orders, etc.) proposed to address concerns identified in report.
- Summary of the amount of garbage and evidence of human waste within 100 feet of dispersed campsites and concentrated use areas.

The 12-Year Recreation Survey and Monitoring Reports shall address, at a minimum, the following factors:

- All the items in the 6-Year Recreation Survey and Monitoring Report.
- Results of visitor surveys.
- Changes in use type, volume, group size, duration of stay, other use pattern and trends.
- Kinds and sizes of recreational vehicles (i.e. trailer, RV).
- Results of resource survey for riparian and lakeshore trampling, and barren core area at popular dispersed sites.
- User perceptions of crowding both at facilities and along lakeshore/lake surface.
- User perceptions on the need for garbage collection at developed sites.
- Percent of users seeing evidence of human waste (including toilet paper) and user perceptions on the need for toilet facilities at dispersed sites and concentrated use areas.
- Kinds, quality, quantity, and range of recreational opportunities visitors are engaging in.
- Preferences in recreation activities and amenities.
- Summarize the most current regional and statewide trends in recreation based on available surveys and reports.

Within 1 year of submission of the Recreation Resources Report, Licensee shall consult with FS to review this report and propose appropriate management actions. In accordance with Condition No. 1, FS reserves the authority to require changes in the Project and its operation to accomplish protection and utilization of NFS resources identified as a result of these surveys.

Future Development Triggers

Future development triggers are addressed in Attachment 1.

Condition No. 38 - License Contact

Licensee shall provide a contact for FS, whenever planning or construction of recreation facilities, other Project improvements, and routine and other maintenance activities are taking place within the NFS lands. Licensee agrees to cooperate with FS through this individual in contract review and work inspection.

Condition No. 39 - Review of Recreation Developments

Licensee shall schedule a meeting with FS at least every 6 years to review all Project- related recreation facilities described in Condition No. 41 and to agree upon necessary maintenance, rehabilitation, construction, and reconstruction work needed and its timing. Because the standard life of recreation facilities ranges from 20 to 30 years, it is anticipated that during the life of the license, facilities that are currently in good condition will need to be redesigned and reconstructed to standards applicable at that time. The criteria for project selection will depend on the amount and type of use, current recreation facility policy, condition of facilities, effects on surrounding areas, and other factors. Following the review, Licensee shall develop a 6-year schedule for maintenance, rehabilitation, and reconstruction, which shall be approved by FS prior to being filed with the Commission.

Condition No. 40 – Annual Recreation Coordination Meeting

Each year during the term of the licenses, Licensee will arrange to meet with interested resource agencies (FS and BLM at a minimum) for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure public safety, and protection and utilization of the recreation facilities listed in of this Plan. The date of the meeting will be mutually agreed to by Licensee and the resource agencies but in general will be held within the first 90 days of each calendar year. A detailed agenda will be provided to the resource agencies when the meeting date is proposed to assure that the appropriate parties are present.

The following will be discussed, at a minimum:

- Need for garbage collection based on the results of visitor surveys, evidence that wildlife is becoming habituated, and the status of garbage and litter left on site by users.
- Need for toilet facilities where dispersed camping is occurring will be discussed at least every 6 years (following submittal of Monitoring Report), and more frequently if warranted.
- Status of recreation projects from the previous year, including rehabilitation of existing recreation facilities, the establishment of new recreation facilities, and any other recreation measures or programs that were implemented.
- Any Licensee proposal for new or increases in recreation fees on NFS lands must be discussed and approved by FS.
- Recreational use data that is available.
- List of the recreation facilities scheduled for rehabilitation and any other Plan measures or programs to be implemented, including:
 - Logistical and coordination planning.
 - Implementation schedule
 - Coordination needs.
 - Permitting requirements.
 - Key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects.
 - Potential adjustments in schedule.

The Annual Coordination Meeting is a minimum requirement; it is anticipated that meetings will occur throughout each year as needed to implement the Recreation Plans.

Any adjustments in specific actions or schedules shall be approved by FS and filed with the Commission.

Condition No. 41 – Recreation Plan

A Recreation Plan was provided in the Final License Application. Considerable progress has been made on updating this plan since the Final License Application was filed. Licensee will, in consultation and coordination with FS finalize a Recreation Plan and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

To assist Licensee in developing a final Recreation Plan for FS approval, the following elements should be addressed in the Recreation Plan:

General Measures For All Recreation Sites

Designated Camping

Allow camping in designated sites only at the following lakes: Fordyce, Rucker, Blue, Lower Lindsey, Carr, Meadow, Kelly, Kidd, Peak and Lake Valley lakes. Fuller will remain a “No Camping” lake.

Routine Recreation Facility Maintenance

On NFS lands, the standards for cleaning, operating and maintaining recreation sites shall be consistent with current FS standards and policies.

Licensee shall ensure that the following routine maintenance occurs at Project recreation facilities on NFS lands:

- At the beginning of each recreation season, and as needed throughout the season, replace, reset, improve, straighten, and reinstall barriers within and adjacent to all project recreation sites; along the roads surrounding Project lakes, and along Project roads and trails where there is uncontrolled vehicle use
- If tables have sunk during the winter due to snow loads, they will be brought up to the level of the surrounding ground and placed on level ground.
- Maintain all recreation facilities in good working order. This includes keeping toilet doors and hardware in operating and locking conditions. If a structure is deemed to be unsafe, it will be closed until repairs are completed.
- Developed sites will be free of litter, human, and domestic animal waste.
- During the prime season all facilities will be inspected on a regular basis (as much as daily or more).
- Litter and trash collection shall be of a frequency that does not encourage animal encroachment, is not overflowing and does not emit offensive odors. The frequency will

depend on the type of container. Two to four-yard dumpsters need to be dumped at least once a week. Receptacles shall be animal resistant.

- Ashes are to be removed from fire rings and grills, cooled and extinguished and disposed of at a county landfill. Ashes are not to be disposed of onsite and ashes which have been previously disposed of onsite (including those disposed of onsite by users) shall be properly disposed of as described above.
- Developed boat ramps will be inspected for obstacles and deterioration.
- Once a facility has been rehabilitated to provide for accessibility, clear floor space surrounding constructed features, graded tent pads and Outdoor Recreation Accessibility Routes shall be maintained.
- Rocks removed from unauthorized fire rings should be turned burned side down outside of the campsite.
- Remove trash from toilet vaults when pumped.
- Remove trash from (road accessed) dispersed sites on a weekly basis between Memorial Day and Labor Day and twice monthly after Labor Day, until the facilities are closed for the winter. Remove trash from non-road accessed dispersed sites on a monthly basis between Memorial Day and Labor Day. Throughout the season, dismantle user created fire rings at lakes where camping is limited to designated sites only.
- Annually maintain site identification markers.

Drinking Water Standards for Recreation Sites that Provide Potable Water

Licensee shall ensure that recreation facilities that provide drinking water as well as new drinking water systems be managed as public drinking water systems (i.e. serve at least 15 service connections or 25 persons) under the federal Safe Drinking Water Act (SDWA) that was signed into law in 1974, and reauthorized in 1996 (or its replacement).

Vegetation Management in Recreation Sites

Licensee shall ensure that vegetation management, including but not limited to hazard tree and branch removal, vegetative screening, brushing, or pruning occurs at Project recreation facilities located on NFS lands. Licensee shall ensure that the following vegetation management elements occur:

- Hazardous trees or branches must be actively searched for and identified by qualified personnel (Land Management Planners, Foresters, Arborists) and removed in a timely manner. In early spring, a qualified person will survey developed recreational facility boundaries, parking lots and immediate access routes to recreation areas for hazard trees and hazardous branches. Identified trees are to be removed before the campgrounds are occupied by the public. If time allows, hazard tree clearing should be conducted in the late fall to remove the bulk of the trees ahead of the spring camping rush.
- For visual mitigation stumps remaining within developed campgrounds shall be no greater than 6 inches in height and preferably cut to ground flush to ground level.
- The slash from hazard tree/branch removal will be chipped or lopped and scattered (<18-inch depth) at least 100 feet away from the recreation site boundary, and the trunk is either hauled away or cut into rounds no larger than 8 inches in diameter and 18 inches long for

use by campers. Larger rounds will be removed from the recreation site or split into firewood size pieces and either stacked for use by campers, or bundled and sold to the campers.

- All freshly-cut conifer stumps within 2 hours after the tree is felled will be treated to prevent the spread of Annosus Root Disease. In no case shall stumps be left untreated at the end of the shift during which the tree was felled. FS approved stump treatment compound, when applied properly, should cover the entire stump surface with a thin layer and also other areas of the stump where the bark has been knocked off. Where a liquid stump treatment compound is used, the spraying of a thin film of the solution on the stumps surface is all that is needed. A dye, mixed in with this solution, is useful to show where stumps have been sprayed. Handling directions are provided on the labels of stump treatment product containers and should always be followed. Only pesticides registered in California can be used on NFS lands, and all FS policies and practices and California regulations relating to pesticide use must be followed. To avoid adverse effects to aquatic species and their habitats, Licensee will work with FS regarding pesticide use within recreational facilities that are within 500 feet of aquatic habitats.
- Licensee will maintain 5-foot radius clearance to bare mineral soil around all fire rings, and remove overhanging branches to a height of 10 feet. This includes fire rings within developed recreation sites and those located at dispersed sites. Because wildfires do not stop at land ownership boundaries, fire ring clearance standards need to apply to NFS, BLM, and Licensee lands.
- During new construction and reconstruction work, Licensee will use care to protect existing vegetation through the incorporation of the Construction Specification Institute (CSI) Section 02233 – Tree Protection, or other specifications that provide equal or better vegetation protection.
- Within and adjacent to all developed project recreation sites, provide for periodic silvicultural evaluation, stand improvement, view enhancement and vegetative planting work to identify unseen hazard trees, assure stand health, provide for screening within & between sites and enhance views or project lakes and other scenic features.

Food Lockers

- Within 2 years of license issuance, install metal animal proof food storage lockers large enough (30-cubic feet) to hold a large cooler at all overnight campsites at all walk-in campgrounds. Adjacent to the locker, provide a clear, level, compacted ground space (aka clear floor space) meeting dimensions and cross slopes specified in FSORAG requirements for “Trash, Recycling and other Essential Containers” (or current requirements).
- Within 2 years of license issuance, at sites with garbage service, all garbage containers will be animal resistant. Adjacent to the garbage containers, provide a clear, level, compacted ground space (aka clear floor space) meeting dimensions and cross slopes specified in FSORAG requirements for “Trash, Recycling and other Essential Containers” (or current requirements).
- Within 5 years of license issuance (unless specified sooner at a specific site), replace all existing plastic food storage lockers with metal animal proof food storage lockers large enough (30-cubic feet) to hold a large cooler and install new metal animal proof food storage lockers at all remaining (Development Scale 2 and above) campgrounds where food

storage lockers are missing (regardless of land ownership). Adjacent to the locker, provide a clear, level, compacted ground space meeting dimensions and cross slopes specified in FSORAG requirements for “Trash, Recycling and other Essential Containers” (or current requirements). These lockers need not be installed in remote, primitive campsites (which consist of a fire ring and site marker only).

Fire Rings

Every 2 years inspect all fire rings, maintain in good condition or replace. Good condition includes a level grill with a usable grate.

Recreation Facility Ownership

Unless otherwise agreed to, all improvements on N FS lands shall become the property of FS upon completion, final inspection, and acceptance by the agency.

Facility Plans

Within 5 years of license issuance, provide as-builts drawing of all project facilities. Asbuilts should reflect current dimensions and layouts, including underground utilities. As alteration, improvement, new construction or expansion occurs, provide updated asbuilts. As-built drawings should be provided in hard copy and an electronic format (“.dwg” format).

Public Information and Education

- Within 2 years of license issuance, provide information about how the public can help prevent the spread of amphibian chytrid fungus and other water-borne pathogens at all information kiosks and boat launches (both formal and informal) in the Project.
- Within 1 year of license issuance, provide signs addressing applicable lake surface regulations at all recreation sites that are located on project lakes and in compliance with land management agency management plans.
- Within 2 years of license issuance, in coordination with FS develop an information strategy which includes maps, information, brochures, signs, websites etc. to provide information to enhance the project recreation opportunities and protect and interpret the area natural and cultural resources. An implementation schedule shall be part of this strategy, with all actions implemented within 5 years of the license issuance. Include educational material aimed at preventing animal habituation; leave no trace camping and other resource protection messages, appropriate to the individual facility. At each Project recreation site, provide an information display with a map and information illustrating the recreational opportunities in the area as well as emergency contact information, proper food storage and other salient information. For facilities on NFS lands identify that the facility is on the Tahoe National Forest. Develop all displays in consultation with the applicable resource agency. Review and, as needed, update recreation information signs on a 6-year cycle. Replace signs as needed.

Minimum Features Required at Newly Constructed and Reconstructed Campground Facilities

All newly constructed and reconstructed campgrounds on NFS lands shall contain a minimum of the following constructed features unless specifically excluded in this Plan (or subsequently agreed to the contrary):

- Roads and spurs with barriers to prevent off road travel.
- Tables.
- Fire rings.
- Animal resistant food lockers.
- Bulletin boards.
- Entrance station and sign.
- Toilets.
- Site markers.
- Leveled tent pads
- Routes between site features (which would include Outdoor Recreation Accessibility Routes (ORARs)-at Development Scale 3 and above).
- To meet the intent of FS accessibility direction, all new or rehabilitated/reconstructed Project recreational areas and facilities on NFS lands will meet FS Outdoor Recreation Accessibility Guidelines (FSORAG 2006) and FS Trail Accessibility Guidelines (FSTAG 2006), or their replacement, current at the time of design.

Heavy Maintenance

Licensee will be responsible for the cost of the necessary maintenance, rehabilitation, and reconstruction, including the costs of design and administration, as determined through the Review of Recreation Developments (as described in Condition No. 39) for the Project recreation facilities. Heavy maintenance and rehabilitation are defined as work that is necessary to keep existing facilities in serviceable condition to meet FS standards and includes components of recreation facilities such as water systems, traffic control barriers, roads, spurs, and associated drainage structures, grills and fire rings, picnic tables, toilets, and signboards. Licensee shall use FS standards for the frequency of heavy maintenance as a guideline, but not a prescription, for Licensee's performance of its heavy maintenance responsibilities. As determined through the Review of Recreation Developments (as described in Condition No. 39), heavy maintenance projects may be deferred that would otherwise be timely under FS frequency standards, if FS determines that actual conditions indicate that the project is not yet necessary.

General Reconstruction

Prior to reconstruction of a recreation facility, Licensee shall meet with FS to review the design of the facility in light of changes in use and design standards since the facility was constructed. Modifications will be made to the facility design to address the functionality of the facility and compliance of the facility with current design standards. This will include, but not necessarily limited to: road widths and geometry and spur width and length (in light of the current vehicle use of the facility); providing additional campsites when warranted by demand; and compliance with current federal and agency accessibility standards: NFS lands - FS Outdoor Recreation Accessibility

Guide (FSORAG), Architectural Barrier Act (ABA) Accessibility Standards (ABAAS) and agency facility design standards, or other applicable standards at the time of design, and; Licensee lands - Americans with Disabilities Act (ADA 1990). Modification of the design may involve land beyond the existing footprint.

Additional features (such as gates) may be added as part of the design modification.

Reconstruction will address site grading and other site modifications including, but not limited to:

- Reconstruction, or replacement of constructed features, including - toilets, gates, table, fire rings, septic systems, water system features, barriers, retaining walls, unit markers, bulletin boards, signs, entrance and fee stations, animal resistant food lockers etc.
- Accessibility - Evaluate opportunity to provide accessibility at all campsites and (to the degree topographically feasible) implement these opportunities. At Development Scale 3 or higher recreation facilities provide Outdoor Recreation Access Routes between constructed features, campsites, toilets and spurs.
- Regrading and graveling non-paved roads and spurs.
- Resurfacing paved road, including providing asphalt treatment of roads and spurs and sufficient subgrade and (where appropriate) providing turn outs at entrance stations, toilets, trash bid pads etc. Providing asphalt treatment of spurs when the circulation road is paved.
- Address opportunities to lengthen and widen spurs as needed.
- Replacement of wood barriers with rock barriers and of sufficient quantity to prevent off road travel. Install additional barriers as needed.
- Remove protrusions and provide a graded living space including tent pads and clear floor space around tables, food storage lockers and grills.
- Installation of gates.
- Upgrade of host sites to improve public service and campground management by allowing the manager to attract high quality hosts.
- Providing enhancements such as extra parking when there is a demand.
- Installing signing that meet FS standards and address recreation area opportunities (including trails), maps of facilities, resources protection information (appropriate for the area), emergency contacts, safety, and regulations (including water surface regulations)

All work should be completed within the year specified below.

Specific Facilities – Lake Spaulding Area

Boat-in Campground

Within 5 years of license issuance:

- Construct a 12-unit Development Scale 2 boat-in campground on NFS land on northeast end of the lake by the Fordyce Creek inlet. The minimum facilities to be included at this campground include toilet, fire rings, picnic tables, site markers, animal resistant food storage lockers, site identification sign and information board.

- Install a boat mooring system for the use and benefit of the boat-in campers. Appropriate lake elevations for this mooring system to be determined.
- Dismantle all other user-created shoreline fire rings in the vicinity of the developed boat-in campground.
- Licensee is responsible for toilet maintenance, including pumping, however the agency may be willing to conduct this work provided the Licensee provides funding to cover all costs including purchase and maintenance of required equipment, waste disposal and funding for third-party maintenance.

Spaulding Lake Campground

Recommendations on Licensee lands:

Within 10 years of license issuance:

- Retro-fit the existing accessible campsite, or relocate the site, to meet current Americans with Disabilities Act Guidelines for Buildings and Facilities (ADAAG), including:
 - Install an accessible access route to the restroom and water spigot, and
 - Pave the accessible spur
- Re-pave the campground circulation road(s).
- Re-pave the existing paved vehicle spurs and pave the existing native surface vehicle spurs.
- Replace picnic tables, fire rings, site markers and vehicle barriers as necessary at each campsite.
- Install an animal-resistant food locker at each campsite.
- Remove the two existing double-vault restrooms at the boat launch (one is located by the walk-in campground, and the other by the parking area), and install one 4-unit accessible vault restroom building, or two double-vault restrooms, as appropriate.
- Provide three accessible parking spaces and access routes to the new restroom(s) at boat launch.
- Retrofit or create one picnic unit to meet American with Disability Act Accessibility Guidelines (ADAAG), if the site terrain allows. The retrofit shall include leveling the picnic site, installing an accessible picnic table, and providing an access route from the parking area.
- Improve the paved access road to the boat launch parking area, where possible.
- On the information board, provide appropriate educational information on land and water related resource protection measures, emergency contacts, recreation and water surface regulations, boat-in camping information, and recreation area and site layout maps.
- Provide showers at Spaulding Lake Campground, or at other campground facility within a one-half hour drive from the Spaulding Lake Campground and provide information to recreationists in the Spaulding Recreation Area as to their location and availability.
- Widen road to boat launch.
- Widen Spaulding Lake Campground circulation roads.

Fuller Lake (Development Scale 3 Facilities)

Within 5 years of license issuance, reconstruct the Day Use/Boat Launch, including:

- Replace/rehabilitate the existing facilities/amenities, i.e. picnic sites and paths.
- Install at least two animal resistant trash receptacles and trash service.
- Relocate the fee station to make it more visible.
- Install a minimum 20-foot long-courtesy dock on the south side of the ramp.
- Improve/expand information board signage with resource protection information.
- Expand and improve the turnaround at the top of the boat launch ramp to accommodate boats/trailers up to 16 feet long.
- Expand the existing trailer parking spaces to 40 feet and add new trailer spaces to create a total of fifteen 40-foot trailer parking spaces.
- Provide 15-20 single vehicle parking spaces at the Fuller Lake Day Use Area and Boat Launch facility, and enough parking opportunities near the Angler Access site to accommodate 40 single vehicles combined between the two sites. Coordinate with FS if it is necessary to define safe parking in the Bowman Road Right-of-Way to accommodate the needed parking.
- Install the following accessible features south of the boat launch: fishing pier; restroom, minimum of one van-accessible parking space, and paths meeting Outdoor Recreation Access Route standards linking all the accessible features. Improve the fish habitat in the location of the fishing pier to attract fish. In design, consider installing one accessible picnic site next to the pier.
- Provide trail system information on a bulletin board at all trail system entry access points: Angler Access; penstock access road intersection with Bowman Road; Rucker Lake Trailhead, and Blue Lake Trailhead.
- If monitoring determines that additional parking is needed at the Spaulding Lake Trail access point off Bowman Road (shared with Fuller lake Angler Access parking), then construct trailhead with single-unit toilet and parking for a minimum of 10 vehicles.

Fuller Angler Access

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Re-grade and place gravel on the existing dirt parking area.
- Improve/expand information board signage (incl. land/water resource protection information).
- Provide ADA parking at the restroom facility and ensure accessible path is provided to the restroom.

Rucker Lake

Within 1 year of license issuance:

- Install and maintain a heavy-duty directional sign for Rucker Lake, Blue Lake, and Rucker Campground at Bowman Road
- Rehabilitate existing campground features, including:
 - Refurbish or replace tables.
 - Replace metal fire rings if not in good condition.
 - Replace or refurbish site identification markers if not in good condition.
- Replace existing smaller food lockers with 30-cubic foot food lockers.
- Provide six additional campsites.
- Define and further develop the trail between the parking area and the camping area.

Within 10 years of license issuance:

- Convert Rucker Campground to a 20-unit, plus one host site, drive-in (non-trailer single car) universally accessible (Development Scale 3) campground with gravel road, picnic tables, fire rings, site markers, parking spurs, two double-unit vault toilets, and 30-cubic foot food lockers.
- Develop and provide potable water with distribution system.
- At host site provide water, septic, and power (solar panels or quiet generator).
- Expand the campground to the east developing the campsites sites at least 100 feet from the shoreline. Cross a short (15-foot) wet spot with an appropriate engineering method to access the flat to the east of the existing campground. Thin the dense stand of trees between the campsites and the shoreline to enhance the lake views from the campground.
- Convert the two sites near the informal boat launch to picnic sites.
- Develop the informal boat launch as an accessible formal car-top boat launch, pave (or gravel), and sign as a boat launch.
- Rehabilitate the 3 or 4 campsites east of the new picnic sites and designate them as walk-in sites and create the designated parking spaces for these sites a minimum of 100 feet away from the shoreline.
- Install a new campground information board with campground and resource protection information.
- Convert the existing campground parking area into a trailhead (parking for 20 vehicles), install a minimum two-panel information board (provide recreation opportunities and natural resources information).

Blue Lake

Recommendations on Licensee lands:

Within 5 years of license issuance: Bring the Blue Lake Dam access road (which parallels the creek after leaving FS Road 18-6) up to Maintenance Level 3 standard for passenger vehicles.

Specific Facilities - Grouse Lake Area

Carr and Feeley Lakes

Carr Lake Campground

Within 5 years of license issuance reconstruct the Carr Lake Campground as a Development Scale 2 facility, including:

- Replace the existing two single-unit toilets with a single-unit accessible toilet (serves 5 campsites).
- Install a double-unit accessible toilet at the southern end of the parking area, with a directional sign for the toilet opportunity at the entrance of the parking area.
- Construct a trail at a 5 percent grade or less from the double-unit toilet to the existing campsites on the northwestern portion of the lake (sites 1-5).
- Construct a trail at a 5 percent grade or less from the double-unit toilet to the new campsites to be constructed on Licensee land on the west side of Carr Lake.
- Rehabilitate the existing campsite facilities and information board.
- Provide tables, fire rings, tent pads, site markers, and animal resistant food lockers (30 cubic foot) at each site.
- Designate parking spaces for Carr Lake Campers.

Carr Lake Campground Expansion

Recommendations on Licensee lands:

Within 5 years of license issuance, on the west side of Carr Lake, create 5 to 6 new campsites on a broad ridge that overlooks Carr Lake. At each campsite, provide fire-ring, picnic table, site marker, animal resistant food lockers (30 cubic foot), clear floor space around site features, tent pad, and paths connecting site with parking area and toilet.

Lindsey Lake Area

Lindsay Lake Campground

Within 2 years of license issuance:

- Replace the single panel entrance station information board with a three-panel kiosk that provides appropriate educational information on land and water-related resource protection measures, emergency contacts, recreation area and campsite layout maps, safety, recreation and water surface regulations, wildfire prevention, sanitation, and preventing the spread of aquatic invasive species and disease causing fungus such as *chytrid*.
- Improve/re-define campsite vehicle spurs with rock barriers.
- Grade, gravel, and remove protrusions in the campground road and vehicle spurs.
- Convert the campsite immediately east of the informal boat launch to a picnic site.

- Install and/or replace existing vehicle barriers along campground road and spurs as needed to effectively manage vehicles.
- Gravel the boat launch, sign as a car-top boat launch and designate and sign a single space for vehicle loading/unloading (but not parking).
- Install directional signage for the Lindsey Campground and trailhead facilities at the intersection of Bowman (FS 18 Rd) and the Carr-Lindsey (FS 17 Rd) Roads to direct Lindsey Lake visitors to FS 18-9 Rd route (shorter). Install directional signs at the intersection of Bowman Road and FS 18-9 Rd, intersection of FS 18-9 Rd and FS 17- 8 Rd, and intersection of FS 17-8 Rd and FS 17 Rd.

Within 15 years of license issuance, redesign and reconstruct campground as a Development Scale 2 facility. Prior to this time, and after the construction of the Lindsey Creek Campground (see new campground facility proposal), coordinate with FS to consider converting all or a portion of the campground to day use, or a combination of day use and hike-in campsites. Reconstruction would include the following:

- Replace toilet if needed. If toilet is not in need of replacement, retrofit toilet to provide lighting (solar tube/skylight), assisted venting (with solar panel powered fans) and an accessible path to entrance.
- Replace tables and fire rings (if the site remains a campsite). If sites are converted to day-use, replace tables and replace fire rings with cement BBQ grills with self- contained ash boxes.
- Provide appropriate signing that meets FS standards and specify that Lindsey Campground is for campers only.
- Replace unit markers.
- Re-gravel road and spurs and barrier as needed.
- Install an animal resistant food locker at each campsite (30 cubic-foot minimum).

Lindsey Creek Campground

Within 10 years of license issuance or when triggers indicate that a new campground facility is needed at Lindsay Lake, whichever comes first:

- Construct a 20- to 25-unit drive-in (Development Scale 3) family campground on the south side of Lindsey Creek across from the Lindsey Trailhead.
- Provide potable water and distribute water to Lindsey Trailhead and Lindsey Lake Campground (or Day Use site if converted). The number of spigots will be appropriate to the Development Scales.
- Access road and campground road will be a gravel Maintenance Level 3 road. Gravel spurs. Cross (bridge or bottomless culvert) over Lindsey Creek west of Lindsey Trailhead.
- Install rock barriers to prevent vehicles from leaving the campground road and spurs.
- Install two double-unit accessible vault toilets.
- Install a 30-cubic foot food locker, picnic table, tent pad, site marker, and fire ring at each site.
- Install site identification sign to FS sign standards.

- Install pay station and information panel (include information on regulations, map of campground, resource protection and recreation opportunities).
- Provide a host site with water, septic (or holding tank), and power (solar panels or quiet generator).

Middle Lindsey, Upper Lindsey, Culbertson, Lower Rock, and Upper Rock Lakes

Within 5 years of license issuance (there is a portion of Culbertson Lake that occurs on NFS lands, and the following measures in that location are required under Section 4(e) of the Federal Power Act while the remaining portions of this measure occurs on Licensee lands and are recommended under Section 10(a) of the Federal Power Act):

- Provide signage to lead backpackers to the dispersed campsites.
- At existing designated walk-in campsites at Middle Lindsey (3 sites), Culbertson (3 sites), Lower Rock (3 sites), Upper Rock (3 sites) Lakes, define campsite with site marker; install/replace (or maintain if in good condition) fire ring. Maintain fire clearing and maintain campsite in trash-free condition.
- Monitor use to determine when additional dispersed campsites would be needed.

Specific Facilities - Fordyce Lake Area

Sterling Lake Area

Sterling Lake Campground Conversion

Within 10 years of license issuance convert to a Development Scale 3 day use area:

- Remove all the campground facilities.
- Install four to five picnic sites set back 100 feet from the water's edge with tables, cement BBQ grills with self-contained ash boxes, and site markers.
- Construct a 5-foot wide path of no more than 5 percent grade from the parking area to the picnic sites.
- Install a (minimum) single-unit toilet.
- Install directional signs to and from reservoir.
- Expand the parking area by 10-15 vehicle spaces.
- Pending DSOD approval, install safety rail across dam for hiker safety.
- Install adequate rock barriers at parking area to prevent off-road vehicle use.

Sterling Lake Dispersed Campsites

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Install at least three primitive campsites on the east end of Sterling Lake, and include a fire-ring and site marker at each site.
- Install an information board with site appropriate resource protection, camping, and regulation information.
- Monitor use and human waste. If human waste exposure causes health risk concerns or over 25 percent of the users notice human waste, and/or monitoring surveys show that a majority of overnight visitors prefer more camping amenities on the lake, then pursue road right-of-way from Sierra Pacific Industries (SPI) for the access road to the east end of the lake. Construct 10-unit developed campground (Development Scale 2) with a minimum of fire rings and site markers at each site, information bulletin board, and single-unit toilet.

Fordyce Lake OHV Signage

Within 1 year of license issuance:

- Maintain OHV barriers and signage installed as part of Licensee's 1994 Exhibit R to prevent OHVs from traveling under the high water mark on NFS lands.
- Pursue Nevada County Ordinance to restrict OHV use under the high water mark of Fordyce Lake.

Fordyce Campground Development

Recommendations on Licensee lands:

Within 3 years of license issuance:

- Install 10 primitive campsites along Fordyce Lake Road. Each campsite will include a fire-ring, an animal-resistant food locker, and a site marker.
- Install a single-unit toilet.
- Install a facility identification sign.

The following measures on N FS lands are required under Section 4(e) and the measures in this area on Licensee lands are recommended under Section 10(a) of the Federal Power Act:

Within 3 years of license issuance:

- Improve/expand information board signage.
- Provide management presence through a person who will patrol Fordyce Lake and Sterling Lake during the prime recreation season (generally, snowmelt in June through September 15).
- Install regulatory signage at logical vehicle access points to discourage vehicle use below the high water line. In the event that the Nevada County ordinance is obtained, the signage shall reference it.
- Install and maintain barriers and signing on the southern arm of the lake to close off uncontrolled OHV use that occurs when the lake level drops.
- Dismantle and remove dispersed rock fire rings and makeshift toilets.

- Limit camping to designated sites only.

Specific Facilities - White Rock and Meadow Lake Areas

White Rock Lake

Within 5 years of the license (the measures in this area on NFS lands are required under Section 4(e) and the measures in this area on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- Define and armor each campsite. Install barriers as needed to prevent vehicle encroachment on the shoreline.
- Grade road along north shoreline and provide for appropriate drainage, as needed. Maintain road in a graded, properly drained condition.
- Install information board with information about leave no trace camping, proper food storage, proper human waste disposal and preventing the spread of aquatic invasive species and disease causing fungus such as *chytrid*.
- Install directional signs at all intersection from Meadow Lake Road (Nevada County Road 843) along the dirt and gravel roads leading directly to the reservoir and back from the reservoir.
- Install vehicle barriers/barricade at the end of the road at upstream end of lake to prevent vehicle use where the meadow restoration is ongoing.
- Annually monitor camping area for bear encounters. At the Annual Recreation Coordination Meeting (Condition No. 40), review the need for animal resistant food storage lockers. If the need arises (such as reports of bear encounters or rodent issues, including plague) install food storage locker, within 1 year.

Meadow Lake

Meadow Lake Dispersed Sites and Signage

Within 5 years of license issuance (most of this area is on NFS lands; the measures in this area on NFS lands are required under Section 4(e), and the measures in this area on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- Prohibit camping along the shore of Meadow Lake except within developed sites or designated sites accessed only by boat. Additional coordination will be needed with the county sheriff to implement the closures on private and Licensee owned land.
- Barricade parking areas. Install information sign indicating the area is for day use parking only.
- Install signage on boat launches and at the campgrounds prohibiting OHV use below high water level and other resource protection messages.
- Install new directional signs at all intersections along the roads leading to and from Meadow Lake (starting at the Fiberboard Road).
- Place aggregate on the two boat launches and delineate launch areas with boulders.

- Develop a small day use area/interpretive site near the boat launch that includes 3 picnic tables and gravel parking (up to 8 VAOT), interpretive display on cultural resource protection, information kiosk, and boat launch. On the information board, provide appropriate educational information on land and water related resource protection measures, emergency contacts, and recreation and water surface regulations. Signing and interpretation will be developed in consultation with FS.

Meadow Shoreline Campground

Within 8 years of license issuance, reconstruct the campground, including:

- Install two single unit vault toilets. The new toilets are to be placed so as to optimize travel to toilets. Provide signing to the nearest toilet near the campsite entrances.
- Relocate and reinforce vehicle barriers to improve vehicle management at each campsite providing parking adjacent to the county road and away from the lakeshore. Re-orient table/fire ring at sites farther from shoreline within approximately the existing footprint.
- Define and armor campsites.
- Provide appropriate signing that meets FS and other applicable agency standards. Replace entrance information board and include signage about resource protection.
- Place spot aggregate at the entrance to and in the parking area of the campsites.
- Construct a pedestrian trail (native surface) from Meadow Knolls Group Campground to the lake in the vicinity of the first two campsites at the Meadow Shoreline Campground and provide signing indicating the location of the toilet in Meadow Knolls Campground.

Meadow Campground

Within 5 years of license issuance: Install information boards. Post signing on resource protection, emergency contacts, and recreation and water surface regulations.

Within 15 years of license issuance, reconstruct campground, including:

- Redesign/relocate spurs and campground roads, as needed, establishing the desirable, logical road and campsite location within approximately the existing footprint.
- Close non-essential routes.
- Delineate roads and spurs with barriers.
- Develop a potable water source (single hand pump acceptable).
- Post signs at Meadow Knolls Group and Meadow Shoreline Campgrounds indicating the location of potable water.

Meadow Knolls Group Campground

Within 20 years of license issuance:

- Reconstruct the group campground to meet current standards as needed.
- Gravel and barrier road and spurs.

- Clean up down logs and slash, and continue to treat vegetation throughout the campground.

Peak and Kidd Lakes

Within 5 years of license issuance (the measures in this area on NFS lands are required under Section 4(e) and the measures in this area on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- Construct and maintain a pedestrian, non-motorized trail from the trailhead near the Upper Peak Lake Dam to the lake at an acceptable grade.
- Gate the road from the trailhead to the lake.
- Replace trailhead bulletin boards and provide signage that meets FS standards including information on leave no trace camping and proper food storage.
- Construct and maintain a non-motorized trail connecting the dispersed campsites that Licensee proposes to construct with the existing trailhead and the existing trail (Palisades Trail) on south side of Lower Peak Lake.

Specific Facilities - Lake Valley Area

Lodgepole Campground

Recommendations on License lands: Within 2 years of license issuance:

- Retrofit the water spigots to Americans with Disabilities Act Accessibility Guidelines nearest to the 2 existing accessible campsites.
- Install 35 new animal-resistant food lockers (one at each campsite).

Silvertip Picnic Area and Boat Launch

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Widen (to 20 feet) and pave the site's access road, from FS Road 19 to the parking area.
- Re-configure the existing parking area to provide spaces for up to 15 single parking spaces and 10 double parking spaces that will accommodate vehicles with trailers.
- Provide one single-accessible parking space and one double-accessible parking space.
- Pave and stripe the parking area.
- If necessary, replace or relocate the existing double-vault restroom with a double-vault accessible restroom to accommodate an expanded parking area.
- Install up to five pedestal grills in a central location.
- Install up to five additional picnic sites.
- Retrofit one picnic unit to meet Americans with Disabilities Act Accessibility Guidelines. The accessible picnic site will need to be near the parking area, because much of the terrain towards the shoreline is significantly sloped.

- Extend the boat ramp to provide launching capabilities through Labor Day for all water year types, except Critically Dry.

Lake Valley Group Campground

Recommendations on Licensee lands:

Within 5 years, develop a new group campground (Lake Valley Group Campground) for 50 to 100 people adjacent to the Silvertip Picnic Area and Boat Launch facility. During design of the facility, Licensee will determine if a suitable location is available within the FERC Project Boundary. If not, Licensee will propose to expand the boundary to include the facility where the campground is ultimately located.

Lake Valley Campground

Recommendations on Licensee lands:

Once the occupancy-monitoring trigger for Lake Valley Reservoir is met (see Attachment 1), a new campground will be constructed at Lake Valley Reservoir.

Specific Facilities - Bear Valley Group Camp and Sierra Discovery Trail

Recommendations on Licensee lands:

Bear Valley Group Campground

- Licensee Grade and level the group area around the large group fire-ring.
- Provide two accessible campsites adjacent to the central group area.
- Grade and level two tent pad areas and an access route from the central group area.
- Create a space within the existing food preparation and cooking area that meets Americans with Disabilities Act Accessibility Guidelines. This area will include a hardened surface (e.g., concrete) with accessible food preparation tables. The area shall also have an accessible path from the central paved access area.
- Install 5 new animal-resistant food lockers adjacent to the central food preparation and cooking area.

Sierra Discovery Trail

Recommendations on Licensee lands: Repair or replace the existing trail boardwalk, as needed.

Specific Facilities – Bear River Corridor

Bear River Trail Project

Recommendations on Licensee lands:

- Cooperate with trail planners to determine the alignment of the trail across Licensees' lands along Bear River, including Project canals, and for trailheads on Licensees' lands.
- Provide for the perpetual public access and use of the trail and roads to reach the trail across Licensee lands. Easements could be held by Placer and Nevada counties in their respective jurisdictions, or by a Land Trust entity (e.g. Bear Yuba Land Trust).
- Provide support for trailhead development, sanitation and signage needs related to the trail on Licensee lands.

Recreation Plan Revision

Licensee shall revise the Recreation Plan when substantial changes occur. Factors that may trigger a revision include but are not limited to:

- Revisions and updates to FS or other applicable management plans.
- Substantial changes (>25 percent change) of Recreation Visits in any activity recreationists of the Project participate in, as revealed in the National Visitor Use Monitoring (NVUM) of the Tahoe National Forest (using the 2010 surveys as a base), similar survey conducted by FS or documented in Licensee's periodic observation and recreation survey.
- Documented substantial changes in demographic use patterns (e.g. increases in size or amount of RV use, changes in types of boats using the lake), visitor needs, recreation preferences, types or patterns of use, season of use changes (such as school schedule changes) or other social factors affecting recreation facilities within the Project area.
- Changes in road maintenance standards or similar physical factors affecting the use of the recreation facilities within the Project area.
- Reaching occupancy (or other) triggers where new, but previously unanticipated, facilities will be required.
- Catastrophic natural events, such as major forest fires or natural disasters, and significant effects of social disorder.
- New federal or state policies, regulations, and laws (including Wilderness designation of land within or near the Project) that significantly affect recreation resources in the Project area.
- Acquisition by FS of non-Licensee private land around project lakes which would allow for improvements where there is a demand, but suitable land was previously unavailable for construction of such improvements.

Frequency of revisions to the Recreation Plan shall be based on consultation among Licensee and FS. Agreed upon changes to this Plan will be incorporated into a revised document or an amendment to this document, and after approval by FS the revised plan will be submitted to the Commission for approval.

Costs of Managing Project-Related Recreation

Within 1 year of license issuance, Licensee shall coordinate with FS to develop a plan to address the costs of managing the Project-related recreation on NFS lands. In addition to addressing the management of the Project facilities, this component shall address, at a minimum, the following:

- Monitor and seek compliance with safety, camping closures, fire clearance, fire restrictions, and other measures.
- Patrol, or provide for patrols, through the fire season with personnel that have the ability to extinguish abandoned and escaped campfires and perform fire prevention duties.
- Provide for patrols through the recreation season (including the peak season, generally Memorial Day to Labor Day, and the shoulder season, generally May 1 through mid-October) with personnel that have the authority to enforce federal 36 CFR 261 regulations on NFS lands.
- Install and maintain signs; adjust as seasonally needed.
- Disperse information to the public including appropriate OHV and firearm use, campfire safety, leave no trace, and other messages to reduce resource impacts and inter-user conflicts.
- Patrol dispersed public use areas within one-quarter mile of all Project lakes and Project-affected waterways.
- Monitor and report vandalism of facilities, cultural sites or other resource damage.
- Report illegal activities and cooperate with law enforcement agencies.
- Monitor and seek compliance with regulations associated with camping, parking, food storage, whitewater boating, and other uses.
- Remove trash, remove evidence of human waste, and clean fire rings from dispersed campsites and other areas of concentrated public use within 1/4 mile of all Project lakes and Project-affected waterways.
- Maintain fuels clearance within 100 feet of all dispersed campsites (including fire clearance around Project-provided steel fire rings and user created fire rings) surrounding Project lakes.
- Remove visitor created fire rings in areas where camping is limited to designated sites.
- Perform other duties that provide for the safety of the public and protection of Project-affected resources.
- Maintain a log of activities, key resource issues, and public concerns to summarize in an annual report provided at least 30 days prior to the Annual Coordination Meeting.
- Coordinate with county sheriff for provided services.
- From May through October provide monthly detailed inspection and reporting of facility maintenance and management to assure they are operated to FS standards.

Condition No. 42 – Visual Resource Management Plan

Licensee will, in consultation with FS, finalize the plan provided in the Final License Application and submit for FS approval. Once the plans are complete, they will be included as part of this condition.

Condition No. 43 – Historic Properties Management Plan

Within 1 year of license issuance, Licensee shall file with the Commission a Historic Properties Management Plan (HPMP) that is approved by FS. The HPMP will be tiered to an anticipated Programmatic Agreement (PA), to which FS requested to be signatories, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. Licensee shall consult with the State Historic Preservation Officer (SHPO), applicable Native American

Tribes, FS, and other applicable agencies during the finalization of the HPMP. Consultation for the finalization of the HPMP shall consist of field (as appropriate) and office meetings.

If, prior to or during ground disturbance or as a result of Project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on NFS lands, as appropriate, and Licensee adjoining property, Licensee shall immediately cease work in the area so affected. Licensee shall then notify FS and shall not resume work on ground disturbing activities until it receives written approval from FS.

If it deems it necessary, FS may require Licensee to perform recovery, excavation, and preservation of the site and its artifacts at Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by FS.

Condition No. 44 – Transportation System Management

Within 1 year of license issuance, Licensee shall file with the Commission a Road and Transportation System Management Plan, approved by FS, for protection and maintenance of Project and Project-affected roads that are on or affect NFS lands. Licensee shall consult with FS and other affected parties in the development of this Plan. Licensee shall take appropriate measures to meet applicable FS Maintenance Levels, Traffic Service Levels, and Road Management Objectives (RMOs). Upon Commission approval, Licensee shall implement the Plan.

Project Roads

Table 9 below contains the Project Roads and Segments that are to be included in the Transportation System Management Plan. Table 9 includes condition ratings, which are from Licensee Roads and Trails Study. Within 1 year of license issuance, Licensee shall improve the roads listed in poor condition to meet FS standards described below.

Table 9 Project Roads

Licensee Road ID Number	Road Name	FS Road ID Number	Ownership	Maintenance	Condition	Total Length (mi)
DS001	Carr-Lindsey Rd.	0017-012	FS	2	Good	1.14
DS004	Lower Peak Rd.	9146-014-02	FS	2	Good- Poor	0.26
DS010	Drum Canal Rd.	TBA ²	FS	2	Good	0.21
DS013	Camp 2 Rd.	TBA ²	FS	2	Poor	0.32
DS017	Pittman Spill	TBA ²	FS	2	Good-	0.08
	Channel North Rd.				Poor	
DS026	Downstream End of Little Tunnel Rd.	0329-004	FS	2	Poor	0.88
DS029	Canal Rd.	0329-003	FS	2	Good	0.34

Licensee Road ID Number	Road Name	FS Road ID Number	Ownership	Maintenance	Condition	Total Length (mi)
DS030	Downstream Steephollow 1 Rd.	0020-017-04 0020-017-04-01	FS	2	Poor	1.31
DS031	East Excelsior Point Rd	0020-017-04	FS	2	Good	0.98
DS032	Growers Rd.	0020-017-04-02	FS	2	Good	0.22
DS035	Chalk Bluff Spur Rd.	0032-003	FS	2	Good	0.78
DS036	Big Tunnel Spring Rd.	0032-005	FS	2	Good	0.38
DS037	Deer Creek Spur Rd.	0032-007-0 1	FS	2	Good	0.39
DS038	Deer Creek Spur Rd.	0032-007-02	FS	2	Good	0.49
DS039	South Yuba Canal Access Rd.	0032-007-01-01	FS	2	Good	0.78
DS041	Drum Powerhouse Rd.	6018-001	FS	5	Poor	2.44
DS042	Dutch Flat Surge Tank Rd.	TBA ²	FS	2	Good	0.04
DS052	Newcastle Powerhouse Rd.	N/A	BOR	N/A	Good	0.38
DS053	Deer Creek Spur Rd.	0032-007-07	BLM	N/A	Good	0.07
DS054	Feely Lake Rd.	0017-006	FS	2	Good	0.27
DS055	Feely Lake Rd.	0017-007	FS	2	Good	0.05
DS060	Boot Rd.	0032-001-01	FS	2	Good- Poor	1.16
DS060-2	Downstream of Boot Rd.	TBA ²	FS	2	Good	0.26
DS060-3	Downstream of Boot Rd.	TBA ²	FS	2	Good	0.02
DS060-4	Steephollow 2 Rd.	TBA ²	FS	2	Good	0.04
DS060-5	13 Mile Spill Rd.	0020-017-05	FS	2	Good	0.46
DS060-6	13 Mile Spill Rd.	TBA ²	FS	2	Good	0.03
DS064	Canal Rd.	0032-004	FS	2	Good	0.36
DS067	Upstream Access to YB-34 Rd.	TBA ²	FS	2	Good	0.01
DS069	Boardman Diversion Dam Rd.	TBA ²	FS	2	Good	0.11
DS071	Little Tunnel Rd	TBA ²	FS	2	Good	0.18
DS074	Spillway Access Rd	TBA ²	FS	2	Poor	0.16
DS075	Chalk Bluff Spur Rd.	0032-007-03	FS	2	Good- Poor	0.26
DS076	Deer Creek Rd.	0032-007	BLM	N/A	Good	0.2
DS082	Downstream End of Little Tunnel Rd.	TBA ²	FS	2	TBD ¹	0.72
DS082-01	Downstream End of Little Tunnel Spur Rd.	TBA ²	FS	2	TBD ¹	0.1
DS083	South Yuba Canal Access Rd.	TBA ²	FS	2	TBD ¹	0.06

Licensee Road ID Number	Road Name	FS Road ID Number	Ownership	Maintenance	Condition	Total Length (mi)
DS084	Bear Valley Spill-SYC Access Rd.	TBA ²	FS	2	TBD ¹	0.03

¹ TBD-TO BE DETERMINED; This information has been determined but still needs to be provided to FS.

² TBA- TO BE ASSIGNED; These FS Road Numbers need to be assigned by FS

Recreation Roads Included in the Transportation Plan

Table 10, below, includes Project Recreation Areas, each of which include one or more Project Recreation Facilities. The facility recreation roads (including recreation access roads, primary campground circulation loops, and parking areas but excluding campground spurs and other non-travel road features) that are on or affect NFS lands shall be included and incorporated in the Transportation System Management Plan. All applicable requirements of the Plan shall be addressed on these roads in addition to what is necessary to execute the Recreation Facilities Plan.

Table 10 Recreation Facility Areas with Recreation Roads to be Included in the Transportation Plan

Project Recreation Facility/Area	Project Recreation Facilities	Ownership
Meadow Lake	Meadow Lake CG, Meadow Lake Shoreline CG, Meadow Knolls Group CG	NFS and PG&E
Sterling Lake	Lake Sterling CG, Lake Sterling Picnic Area (proposed)	NFS and PG&E
Fordyce Lake	Fordyce Lake Primitive CG (proposed)	NFS and PG&E
Fuller Lake	Fuller Lake Recreation Area	NFS and PG&E
Rucker Lake	Rucker Lake CG	NFS
Lower Lindsey Lake	Lindsay Lake CG Lindsey Trailhead Lindsey Creek CG (proposed)	N FS
Carr Lake	Carr-Feely Trailhead Area	NFS and PG&E
Spaulding Lake	Lake Spaulding CG	NFS and PG&E
Lower Peak	Lower Peak Primitive Campsites (proposed)	NFS and PG&E

Planning and Inventory

At a minimum, the Transportation System Management Plan shall include the following components.

- Map(s) in electronic format compatible with FS Travel Management Routes and GIS database showing all Project, Project Recreation and Project-affected roads, culverts, bridges, drainages, watering sources, signs, gates, hazards, sensitive resource areas, erosion features, borrow and disposal sites for surplus rock and soil from road maintenance within and adjacent to the FERC Boundary.
- Table(s) in electronic format identifying uses (e.g. recreation, facility access) of the roads and season of operation, FS road identification number, Licensee's road identification number, ownership, maintenance level, condition, length, road dimensions, surface type, mile posts, and other identifiers.
- An inventory table in electronic format of all road and road facility conditions including any construction or maintenance needs. Identify each Project Roads and identify how and when it will be addressed further. All road/ segments on Federal Lands listed in poor condition shall be repaired within the 1 year of License issuance.
- A Traffic Safety and Signing Component, including an inventory and condition for existing and proposed traffic/road signs and a schedule for sign maintenance for all Project Roads. Include road identification signage consistent with Motorized Travel Management Direction and directional signage that is prominent and clearly guides the public to and from each recreation facility. The directional signs shall be placed as needed to clearly direct people to and from the Project Facilities and may not be solely on Project Roads. The sign component shall be approved by FS. The sign component shall meet all current MUTCD and FS requirements;
- Within 1 year of license issuance, Licensee and FS will review the existing FS inventory of of all illegally built user created routes coming off Project Roads or other facilities such as pipelines, ditches, etc. and develop a schedule to rehabilitate and barricade the affected areas.
- Any proposed changes to maintenance levels.

Operation, Maintenance, and Road-Associated Debris

- Develop and submit for FS approval annual road operation and maintenance (O&M) schedule for Project Roads on NFS lands to comply with FS standards, specifications, RMOs, BMPs including all state requirements, and Travel Management guidelines;
- Complete normal maintenance activities on an annual basis including: road surface maintenance, repair and replacement of damaged culverts, cleaning debris and rockfall from drainage channels, vegetation removal to allow adequate sight distances, vegetation removal to maintain an open traveled way consistent with FS standards.
- Develop and implement a Pavement Management System, approved by FS to economically maintain and extend the life of pavement on Project and Recreation Roads by tracking pavement surface condition and guiding in the schedule of repairs. Include repairs in the annual program of work. Examples of components that will be included in the Pavement Management System are
 - A rating of pavement condition identifying good, fair and poor pavement by a qualified individual
 - Assigning importance ratings for road segments, based on traffic volumes, road functional class, and user demand to guide in priority of work and repairs
 - A schedule of maintenance for good roads to keep them in good condition

- A schedule of repairs for poor and fair pavements
- Describe types of road-associated debris (e.g. native materials such as dirt, rocks, trees, etc.), any acceptable locations on N FS lands where this material can be stored (identify if temporary only or permanent), and measures to control erosion, weed infestation, etc. on these piles. Remove all road spoil piles not currently located at approved sites on NFS lands to a location either off the Forest, or to a FS approved disposal site.
- Include any required limited operating periods (LOPs) for wildlife species and noxious weed prevention provisions in planning and performing maintenance activities.
- Comply with all State and FS, specifically Tahoe National Forest, guidance and direction for prevention and management of noxious weeds on areas that are on or affect NFS lands.
- Comply with all current FS O&M guidelines.
- Provide for fish and aquatic passage and proper stream function for all stream crossings that are identified as fish habitat areas.
- When replacing culverts and other stream crossings on NFS land, Licensee shall adhere to design guidelines appropriate for the FS level designation for the road.

Construction and Reconstruction

- Develop a road construction and reconstruction implementation schedule to bring existing roads and associated facilities (i.e. culverts, gates, bridges, crossings, cribwalls, barricades, etc.) into compliance with FS standards that achieve FS RMOs and Motorized Travel Management Guidelines for Project Roads. The schedule shall ensure that Project Roads are in compliance with these standards within 5 years of completion of the Plan.
- During construction and reconstruction activities, comply with all current FS O&M.

Monitoring

- Within the first year of license issuance, unless waived by FS, conduct traffic use surveys approved by FS. The traffic use survey will be at FS designated locations on Project Roads. Thereafter, conduct traffic surveys every 6 years (coincident with the Commission's recreation Form 80 schedule) at FS-specified locations, to determine the number and type of vehicles per day, describe study periods and reporting requirements, and determine use trends. Conduct a minimum of 60 survey days during survey years.
- Conduct a road capacity and use review every 6 years following completion of use surveys, to determine if the roads continue to meet current road management objectives. If FS determines roads no longer comply, define actions and timelines to correct deficiencies;
- Following annual or periodic monitoring, any roads or bridges found to not meet FS standards and guidelines requiring work beyond normal O&M shall be identified. This list, along with proposed measures to bring the roads or bridges into compliance, shall be submitted to FS at least 30 days prior to the Annual Meeting required under Condition No. 1 or as needed.

Condition No. 45– Fire Management and Response Plan

Within 1 year of license issuance, Licensee shall complete, in consultation with FS, BLM, Cal Fire, potentially affected Tribes, and other interested parties, and approved by FS, a Fire and Fuels Management Plan (FFMP). The plan shall set forth in detail Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to Project operations. Upon Commission approval, Licensee shall implement the Plan.

Minimum components include, but may not be limited to:

- Fuels Treatment/Vegetation Management: Identification of fire hazard reduction measures and reoccurring maintenance measures to prevent the escape of project- induced fires.
- Fire Prevention and Patrol: Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access. Identify water drafting sites and other fire suppression resources.
- Emergency Response Preparedness: Analyze fire prevention needs including equipment and personnel availability.
- Reporting: Licensee shall report any project related fires immediately to FS.
- Fire Control/Extinguishing: Provide FS a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Condition No. 46 – Review of Improvements on National Forest System Lands

If during the term of the License the Commission determines that the project involves the use of any additional National Forest System (NFS) lands, outside the current project boundary, Licensee shall obtain a special use authorization from FS for the occupancy and use of such additional NFS lands. Licensee shall obtain the executed authorization before beginning any ground-disturbing activities on NFS lands outside the FERC boundary covered by the special use authorization, and shall file that authorization with the Commission if the activity is related to the Project. Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed occupancy and use that FS needs in order to make a decision concerning issuance of a special use authorization.

If, during the term of the License, Licensee proposes to perform any project construction work, Licensee shall obtain a construction temporary special use authorization from FS before beginning any ground-disturbing activities on NFS lands outside the FERC boundary. The special use authorization will include appropriate vegetation management and erosion control measures as needed to protect NFS lands and resources. Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed construction that FS needs in order to make a decision concerning issuance of a construction temporary special use authorization. Licensee may commence ground-disturbing activities authorized by the License and construction temporary special use authorization no sooner than 60 days following the date Licensee files FS temporary special use authorization with the Commission, if the temporary special use authorization is related to Project activity, unless the Commission prescribes a different commencement schedule. In the event there is a conflict

between any provisions of the License and FS special use authorization, the special use authorization shall prevail to the extent that FS, in consultation with the Commission, deems necessary to protect and utilize NFS resources.

Attachment 1. Monitoring indicators, methods, triggers and triggered actions for hosted/reservation campgrounds and self-pay/no-host campgrounds, day use facilities and primitive campsites.

HOSTED/RESERVATION CAMPGROUNDS		
Monitoring Indicator and Conditions		<p>INDICATOR: Non-holiday weekend day (Friday and Saturday) occupancy</p> <p>SEASON: June 15-August 15</p> <p>CONDITIONS:</p> <p>The non-Holiday weekend (Fri (night)/Sat (night)) combined annual peak season (June 15 to August 15) average occupancy for similar campground types within the geographic groupings shown in Table 2. Campground host sites are exempt from this annual average peak season combined occupancy calculation.</p> <p>The single highest and lowest occupancy during the peak season will be omitted from the average occupancy count to minimize the influence of anomalous days (i.e. bad weather, events...). For a typical year, this will result in 14 days (Fri/Saturday nights) for the annual peak season combined occupancy calculation.</p> <p>The occupancy will only be calculated for days when the campground is open during the peak season. In a particular year, if there are less than 10 days to calculate the annual peak season combined occupancy, then this year will not be considered for trigger</p>
Phase 1	Data	DATA COLLECTION METHODS: 1) Family Campgrounds: daily occupancy collected by host/caretaker ¹ , or if applicable reservation records, or other agreed upon methods; and, 2) Group Campgrounds: daily paid reservation records. <i>Note:</i>
	Collection Method 1	<i>\$ Q XnRFFXSied, bXPRTHLY11 1111ZICaff FRgIGHEIRFFXSIE IIRUTHITIE/JIII</i>
	Trigger 1	90% Average Annual Occupancy of campsites within geographic grouping in 1- year out of 6-year rolling period.
	Action if Trigger 1 is Not Met	Continue monitoring method for Trigger 1.
	Action if Trigger 1 is Met	<p>Perform Suitability-Feasibility² analysis no later than the calendar year after Trigger 1 is met</p> <p>Start Method 2 monitoring</p> <p>Implement recreation use management process³ starting in calendar year after trigger is</p>
Phase 2	Data Collection Method 2	<p>DATA COLLECTION METHODS: 1) Family Campgrounds: daily occupancy collected by host/caretaker¹, or if applicable reservation records or other agreed upon method; and 2) Group Campgrounds: daily paid reservation records. <i>Note:</i></p> <p><i>\$ Q XnRFFXS MICEXt reHIYeI sNIZICaff FRgIGHLT"RFFXSIE IIRUTHITIELLIII</i></p>
	Trigger 2	95% Average Annual Occupancy of indicator reached two additional times during the 6-year rolling period. Do not have to wait for all 6 years if Trigger 2 is met sooner.
	Action if Trigger 2 is Not Met	Revert back to 6-year rolling annual monitoring (Method 1).
	Action if Trigger 2 is Met	Start Site Development Process for new campground (NEPA analysis and conceptual design, Final Plan Development and Construction to follow NEPA) or , if the FS decision is to not develop a new facility, continue implementation of recreation use management processes ¹ as agreed upon. .

SELF-PAY/NO HOST CAMPGROUNDS, DAY USE FACILITIES, and PRIMITIVE CAMPSITES		
Monitoring Indicator and Conditions		INDICATOR: Non-holiday Saturday occupancy
		SEASON: June 15-August 15
		CONDITIONS:
		<p>The non-Holiday weekend (Sat) combined annual peak season (June 15 to August 15) average occupancy for similar campground/day-use types within the geographic groupings shown in Table 2.</p> <p>The single highest and lowest occupancy during the peak season will be omitted from the average occupancy count to minimize the influence of anomalous days (i.e. bad weather, events...). For a typical year, this will result in 6 Saturdays for the annual peak season combined occupancy calculation.</p> <p>The occupancy will only be calculated for days when the campground/day-use is open during the peak season. In a particular year, if there are less than 4 days to calculate the</p>
Phase	Data	DATA COLLECTION METHODS: On-site observations every 3rd and 6th years
1	Collection Method 1	within the 6 year Form 80 Cycle: Record non-holiday weekend facility occupancy rates on all Saturdays from June 15 to August 15. Counts will be conducted after noon.
	Trigger 1	90% average annual occupancy or above of indicator reached during one of the monitoring years (Year 3 or Year 6).
	Action if Trigger 1 is Not Met	Revert back to Phase 1 monitoring (every 3 rd and 6 th years during FERC Form 80 Cycle).
	Action if Trigger 1 is Met	<p>Perform Suitability-Feasibility² analysis no later than the calendar year after Trigger 1 is met.</p> <p>Start Method 2 monitoring</p> <p>Implement recreation use management process¹ starting in calendar year after trigger is</p>
Phase	Data	On-site observations annually for next 3 years: Record non-holiday weekend facility occupancy rates on all Saturdays from June 15 to August 15. Counts will be conducted after noon.
2	Collection	
	Trigger 2	<p>Average Seasonal Occupancy during the 3 additional years of monitoring for combined facilities in the same grouping (see Table 2 for groupings) meets or exceeds:</p> <p>90% Average Seasonal Occupancy each year</p>
	Action if Trigger 2 is Not Met	Revert back to monitoring every 3 rd and 6 th years during the Form 80 monitoring cycle (Method 1).
	Action if Trigger 2 is Met	Start Site Development Process for new campground (N EPA analysis and conceptual design, Final Plan Development and Construction to follow NEPA) or , if the FS decision is to not develop a new facility, or continue implementation of recreation use management processes ¹ as agreed upon.

¹ Forest Service may monitor host/caretaker occupancy data or conduct data collection independently to verify accuracy.

² Feasibility/Suitability:

Before site development planning, the monitoring program provides for a feasibility and suitability analysis to determine if site development is possible at a Project reservoir or Project reservoirs within a facility monitoring grouping (Table 2). A proposed development will be considered suitable, if the development is: 1) practical and reasonable based on the site conditions; 2) appropriate for the ROS Class regulations, standards and policy; and 3) appropriate for the level of use desired based on direction by applicable land and resource management plans ,

including revisions or amendments to land management plans. Further, NID on NID land, and the Forest Service on NFS land, will make the final determination as to whether a proposed development is considered suitable and feasible. A proposed development will be considered suitable and feasible if the development is:

1. Practical and reasonable based on the site conditions;
2. Appropriate for the ROS Class setting established for the lands; and
3. Appropriate for the level of use desired based on direction by applicable land management plans, including revisions or amendments to land management plans.

³ Examples of Recreation Use Management Processes:

- Educate visitors about other regional day-use areas and campgrounds.
- Implement more on-site management (provide camp host, bring in amenities).
- Implement a fee for use (if applicable).

Overflow:

For all infrastructure items, especially campgrounds, the Licensee will also address overflow facilities at this time. Specifically, the Licensee must address any potential overflow impacts, especially in regard to impacts to natural resources. In particular, the Licensee must address controlling motor vehicles (signing, barriers) and human waste (CXT or portable toilets). Typically these overflow areas will not include additional amenities (picnic tables, fire rings, tent pads), but could do so if the Licensee and the resource agency(s) agree to provide such. Address during annual O & M meeting between licensee and FS.

Table 2. Drum-Spaulling Project: Monitoring Trigger Groupings.

	Facility Type	Grouping	Reservoir	Facility	Current Indicator Capacity*
FAMILY AND GROUP CAMP-CGs	Family CG	Remote	Fordyce	Fordyce Lake Campground (proposed)	10 units
		Remote	Meadow	Meadow Lake Campground	15 units
				Meadow Lake Shoreline Campground	10 units
		Interstate 80	Spaulding	Lake Spaulding Campground	35 units
			Lake Valley	Lodgepole Campground	35 units
		Bowman Road	Lower Lindsey	Lower Lindsey Lake Campground	12 units
			Carr	Carr Lake Campground (hike-in developed campsites less than 300 feet from parking)	7 units Sites within 300 feet of parking will be considered developed, and sites further than 300 feet will be considered primitive.
			Rucker	Rucker Lake Campground (proposed)	20 units
		Boat-In Family CG	Project- wide	Spaulding Boat-In Campground	12 units
		Boat-In			
	Group CG	Project- wide, Developed	Kidd	Kidd Lake Group Campground	3 units (100 PAOT)
			Lake Valley	Lake Valley Group Campground (proposed)	2 units (50-100 PAOT)
			Bear Valley	Bear Valley Group Campground	1 unit (100 PAOT)
		Project- wide, Primitive	Meadow	Meadow Knoll Group Campground	2 units (50 PAOT)

* Site capacities will change as Project development plans are implemented. Use current available capacity at time of survey.

Table 2. (continued)

	Facility Type	Grouping	Reservoir	Facility	Indicator Capacity*
DAY USE AREAS AND PRIMITIVE CAMPSITES	Primitive/Hike-In	Remote	White Rock	Primitive campsites	6 units
		Remote	Sterling	Primitive campsites (proposed)	3 units
	CGs	Interstate 80	Lower Peak	Primitive campsites (proposed)	5 units
		Bowman Road	Culbertson	Primitive hike-in campsites	3 units
			Lower Rock	Primitive hike-in campsites	3 units
			Middle Lindsey	Primitive hike-in campsites	3 units
			Upper Rock	Primitive hike-in campsites	3 units
			Blue	Primitive hike-in campsites	9 units
			Carr Primitive	Primitive hike-in campsites greater than 300 feet from parking	4 units Sites within 300 feet of parking will be considered developed, and sites further than 300 feet will be considered primitive
	Day Use Facilities	Remote	Sterling	Lake Sterling Day Use Area (proposed)	4 or 5 (TBD) units, spaces TBD
		Remote	Kelly	Kelly Lake Picnic Area	3 units, 6 spaces
		Interstate 80	Lake Valley	Silvertip Picnic Area & Boat Launch	10 units, 25 spaces
			Spaulding	Lake Spaulding Picnic & Boat Launch	3 units, 67 spaces
		Bowman Road	Bear Valley	Sierra Discovery Trail (incl.	32 spaces
		Bowman Road	Fuller	Fuller Lake Day Use & Boat Launch, Angler Access	8 units, 45 spaces
	Trailhead Facility	Bowman Road	Carr	Carr-Feeley Trailhead	30 spaces
			Lower Lindsey	Lower Lindsey Lake Trailhead	20 spaces

* Site capacities will change as Project development plans are implemented. Use current available capacity at time of survey.

Table 3. DS facilities - New facilities to be constructed when implementation triggers are met.

Licensee	Recreation Area	Reservoir	Facility Group Hitting Trigger	Facility to be constructed when trigger is reached:
PG&E	Spaulding	Spaulding	Spaulding Lake	Lake Valley Campground (PG&E lands).
		Lake Valley	Campground Lodgepole	
	Grouse/Spaulding	Rucker	Campground	Lindsey Creek
		Lower Lindsey	Rucker CG (modified) Lindsey Lake CG	Campground* (NFS lands) * When Triggers are met or within 10 years from license issuance, whichever comes first.
		Carr	Carr CG (modified)	

Appendix H-2

Bureau of Land Management 4(e) Conditions: Drum-Spaulding Project

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U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF LAND MANAGEMENT'S PRELIMINARY
COMMENTS, SECTION 4(e) CONDITIONS, AND 10(a)
RECOMMENDATIONS
FOR THE BENEFICIAL USE OF BLM LANDS IN AND AROUND THE
DRUM-SPAULDING PROJECT,
FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 231 0-193

V. PRELIMINARY RECOMMENDATIONS, TERMS AND CONDITIONS FOR THE DRUM-SPAULDING PROJECT

BLM through its preliminary recommendations, terms and conditions, and prescriptions seeks to ensure appropriate levels of resource protection are incorporated in any new license. BLM recommends that FERC include in any new license issued for the DS Project the following BLM preliminary recommendations, terms and conditions. BLM believes that the resource measures presented in this section adequately address impacts to the ecological and cultural resources impacted by the YB Project.

PROPOSED LICENSE ARTICLES FOR THE DRUM-SPAULDING HYDROELECTRIC PROJECT, FERC NO. 2310-173

These Proposed License Articles are submitted to FERC as 4(e) Conditions (both specific and general/administrative) and 10(a) Recommendations.

a. Preliminary 4(e) Conditions

Condition No. 1 Annual Employee Training

Licensee shall, beginning the first full calendar year after license issuance, annually perform employee awareness training. The goal of the training shall be to familiarize Licensee's operations and maintenance (O&M) staff with special-status species, non-native invasive plants and sensitive areas (e.g., special-status plant populations and non-native invasive plant locations.) that are known to occur within or adjacent to the FERC Project Boundary on public land administered by BLM, procedures for reporting to BLM, and BLM orders, as appropriate. Licensee shall provide to each O&M staff a confidential map showing these sensitive areas including GPS coordinates, as well as pictures and other guides to assist staff in recognizing special-status species and non-native invasive plants. It is not the intent of this measure that Licensee's O&M staff performs surveys or becomes specialists in the identification of special-status species or non-native invasive plants. Licensee shall direct its O&M staff to avoid disturbance to sensitive areas, and to advise all Licensee contractors to avoid sensitive areas. If Licensee determines that disturbance of a sensitive area is unavoidable, Licensee shall consult with BLM, as appropriate, if the disturbance may occur to public land administered by BLM prior to any ground disturbing activities in the sensitive area to minimize adverse effects to sensitive resources.

Condition No. 2 Coordinated Operations Plan

Licensee shall, within 90 days after issuance of new licenses for the Yuba-Bear Hydroelectric Project or Drum-Spaulding Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan (Plan). Licensee shall develop the Plan in consultation with the licensee for the Yuba-Bear Hydroelectric Project. The purpose of the Plan shall be to provide for coordination between the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project regarding implementation of flow-related measures in each Project's license. Licensee shall file

the Plan with evidence of consultation as the Plan relates to compliance with flow-related measures, with FS, BLM, CDFG, and the State Water Board, and licensee of the Yuba-Bear Hydroelectric Project, with the Commission Licensee shall implement those portions of the Plan approved by the Commission.

Condition No. 3 Coordination of the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project Operation Regarding the Yuba-Bear Hydroelectric Project's Streamflow Requirements in the Bear River Below Rollins Reservoir at YB-196

Licensee of the Drum-Spaulding Project shall not divert water to the Bear River Canal that Licensee of the Yuba-Bear Hydroelectric Project releases from Rollins Reservoir to meet the Yuba-Bear Hydroelectric Project's Flow Measures in the Bear River below the Rollins Reservoir as measured at Nevada Irrigation District's (NID) YB-196 gage (USGS 11422500). Licensee's compliance with this measure will be the act of not diverting water into the Bear River Canal that Licensee of the Yuba-Bear Hydroelectric Project releases from Rollins Reservoir to meet its Flow Measures in the Bear River below Rollins as determined utilizing data from NID's YB-196 gage in Bear River and PG&E's YB-50 gage in Bear River Canal, and the coordinated operations flow forecasts for water that NID will provide at YB-196 and for water that PG&E will divert to the Bear River Canal. Licensee's Coordinated Operations Plan with the licensee of the Yuba-Bear hydroelectric Project shall specifically require coordination between the two licensees of both projects to effectuate compliance with this measure.

Condition No. 4 Canal Outages

This measure pertains to canal outages that affect Minimum Streamflows described in Part 2 of this measure. For the purpose of this measure, there are three types of canal outages: 1) annual planned outages; 2) non-routine planned outages; and 3) emergency outages. For the purpose of this measure: an "annual planned outage" is defined as an outage that is typically taken around the same time each year for routine maintenance; a "non-routine planned outage" is defined as an outage for work that is high priority work (often major maintenance) and performed under planned conditions but is not performed during the annual planned outage period; and an "emergency outage" is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents.

During the Annual Consultation Meeting (Condition No/ 23), Licensee will inform meeting participants about annual planned outages, including the anticipated time-frame the annual planned outages will occur, and any non-routine planned outages that are already planned at the time of the Annual Meeting, for the upcoming year. Licensee will in good faith provide CDFG, SWRCB, FS, and BLM as much notice as reasonably possible for any annual planned outages or non-routine planned outages that were not noted in the Annual Meeting or that become anticipated to occur at a time that is different than reported in the Annual Meeting or different from the approximate time of year listed in Table 4. For all annual planned outages and non-

routine planned outages, Licensee will comply with the Fish Management me as well as all laws and permitting requirements, as applicable. Licensee will provide CDFG, SWRCB, FS, and BLM notice by electronic mail as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after an emergency outage occurs.

Table 4 of this measure lists canals where outages may affect Minimum Streamflows in assure Part 2 of this measure and provides the Minimum Streamflows required during the first 30 days of annual planned outages, non-routine planned outages or emergency outages. If an annual planned outage, non-routine planned outage, or emergency outage is anticipated to extend past 30 days, Licensee shall consult with the CDFG, SWRCB, FS, and BLM regarding Minimum Streamflows for the remainder of the outage after the first 30 days and Licensee shall implement the collaboratively agreed upon Minimum Streamflows as soon as it is reasonably possible to do so for the remainder of the outage. Licensee shall also file any collaboratively agreed upon changes in Minimum Streamflows with the Commission. Table 4 also lists the approximate time of year and typical duration that each annual planned outage occurs. However, annual planned outages may in any given year last longer or occur outside of the approximate time frame identified in Table 4. Licensee will not take the Drum Canal and the Bear River Canal out of service simultaneously unless there is an emergency.

Table 4. Locations listed in Part 2 of this measure where canal outages affect Minimum Streamflows.

Location	Typical historical outage period/duration	Minimum Streamflows During Annual Planned Outages, Non-Routine Planned Outages and Emergency Outages
South Yuba Canal above Deer Creek Forebay - YB-34	Approximately 2 weeks in late March to early April (South Yuba Canal and/or Chalk Bluff Canal)	When the South Yuba Canal or Chalk Bluff Canal is out of service, no Minimum Streamflows shall be required at YB-34.

Condition No. 5 Canal Outages Fish Rescue Plan

A Canal Outages Fish Rescue Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS, BLM, CDFG, and State Water Board approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 6 Recreation Agreement

Beginning 90 days after license issuance, the licensee shall enter into a Recreation Operation and Maintenance agreement to establish the process for constructing a vault toilet at Purdon

Crossing; kiosk at Purdon and Edwards Crossing; an eight-foot wide path leading from the river to the trailhead, or parking area, of Edwards and Purdon Crossing; and replacing the vault toilet at Edwards Crossing in approximately 10-15 years. Additionally, licensee shall begin providing annual funding in a contributed funds account set up by BLM to provide \$30,000 annually with adjusted GDP-IDP, for operation, maintenance, law enforcement patrolling, and administration. The cost basis for these payments shall be year 2012. The cost shall be escalated annually based on the U.S. Gross Domestic Product – Implicit Price Deflator (GDP-IDP). NOTE: Need signed Agreement to pull out this Condition 6 and replace with Reopener for nonpayment.

Condition No. 7 Ecological Group

The licensee shall, within 3 months of license issuance, in coordination with FS, BLM, CDFG, State Water Board, and other interested stakeholders, establish an Ecological Group for the purpose of assisting the Licensee in the implementation of project-wide of monitoring plans, and review and evaluation of monitoring data. The Ecological Group will also provide guidance on implementation of the South Yuba River Flow Adjustment Condition.

The Licensee shall provide to FS, BLM, CDFG, State Water Board, interested stakeholders, and the Commission by June 30 of each year an annual report of the activities of the Ecological Group

Condition No. 8 Modifications of 4(e) Conditions in the Event of Anadromous Fish Re-introduction

BLM, reserves the right to modify these conditions to respond to any reintroduction of Chinook salmon or steelhead trout listed under the Endangered Species Act to stream reaches through BLM lands where the flow is controlled by this Commission licensed facility.

Condition No. 9 Gaging Plan

A Gaging Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with the FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS, BLM, CDFG, and State Water Board approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 10 Wildlife Crossings – Bear River and Drum (Chalk Bluff) Canals

Within one year of license issuance, the Licensee shall complete, approved by FS, BLM, and CDFG, a Wildlife Crossing Plan for placing wildlife crossings for the Bear and Drum and Chalk Bluff Canals that is integrated with wildlife escape structures and exclusion fencing to reduce wildlife mortality.

Unless otherwise agreed to by FS, BLM, and CDFG, crossing structures shall maximize the continuity of native soils adjacent to and on the wildlife crossing and meet the following minimum specifications: (1) Overcrossing shall be a minimum of 12 feet wide with fenced 8-

foot-high side railings, and access ramps less than 30 percent grade; or (2) Undercrossing shall be a minimum of 10 feet high by 10 feet wide (with 2-foot width of dry path above the high water mark if a perennial stream) with natural substrate. Upon agreement by FS, BLM, and CDFG, Licensee may retrofit or redesign existing features. The Plan will include an implementation schedule, with implementation beginning two years from license issuance, and completion within five years, unless otherwise agreed to by FS, BLM, and CDFG. Minimum components of the Plan include, but may not be limited to:

- Locations for planned and existing licensee-maintained wildlife crossings, to provide movement approximately every 0.75 mile in combination with natural landscape features that also meet the above specifications
- Overpass or underpass design
- Map of all conduits, with segments identified by canal mile
- Map of all crossing structures, wildlife escape ramps and flashers with corresponding GPS coordinates
- Implementation schedule
- Annual monitoring and reporting of crossing condition, maintenance and repair activities

Condition 11. Replacement of Wildlife Escape and Wildlife Crossing Facilities

Prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along Project canals, Licensee shall consult with CDFG regarding specifications and design and with BLM. Licensee shall file the design, including evidence of consultation, with the Commission within 60 days after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Licensee shall also assess existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order. Inspections shall occur at the same time other types of maintenance activities or canal assessments are being conducted.

Condition No. 12 Monitor Animal Losses in Project Canals

Beginning in the first full calendar year after license issuance, Licensee shall record animal losses in all Project canals. Specifically, Licensee's operators shall record in log books all dead animals observed on canal trash racks and otherwise in the canals using the Wildlife Mortality data sheets found in Appendix 4-2A of the Wildlife Movement Technical Memorandum (4-2) included in Appendix E12 of Licensee's application for new license. Licensee shall make a good faith effort to record the location of the dead animal (i.e. which Project canal, where in the canal the dead animal was found, and the associated structure), species, date and time of the observation, suspected cause of death if it can be determined from visual observation only, photograph if available, estimated size, estimated age, and sex if known, and other pertinent information. The information will include the cumulative years and preceding year's mortality by canal segment, and a map showing segments (defined by location of trash racks). Licensee shall provide this information to CDFG, FS, and BLM at least 60 days prior to the annual consultation meeting described in Condition 23.

Licensee shall consult with FS, BLM, and CDFG and other interested parties during the annual consultation meeting, regarding the protection and utilization of the wildlife resources affected by the Project. If there is an increasing trend in animal mortalities in a canal, additional measures to address suspected Project-related causes for that canal may be developed by Licensee in consultation with CDFG, FS, and BLM.

Condition No. 13 Special Status Species

Before taking actions to construct new project features on BLM lands that may affect BLM special status species or their critical habitat on BLM land, the Licensee shall prepare and submit a biological evaluation (BE) for BLM approval. The BE shall evaluate the potential impact of the action on the species or its habitat. BLM may require mitigation measures for the protection of the affected species on BLM administered land.

The biological evaluation shall:

- Include procedures to minimize or avoid adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition No. 14 Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land

The Licensee shall, beginning the first full calendar year after license issuance, in consultation with FS, BLM, and CDFG, as appropriate, annually review the current lists of special status species (species that are Federally Endangered or Threatened, Proposed Threatened or Endangered BLM Sensitive, State Threatened or Endangered, and CDFG Fully Protected) that might occur on BLM lands in the Project area that may be directly affected by Project operations. When a species is added to one or more of the lists BLM, and CDFG, as appropriate, in consultation with the Licensee shall determine if the species or un-surveyed suitable habitat for the species is likely to occur on such BLM lands. For such newly added species, if BLM determines that the species is likely to occur on such BLM lands the Licensee shall develop and implement a study plan in consultation with BLM, to reasonably assess the effects of the project on the species. The Licensee shall prepare a report on the study including objectives, methods, results, and recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to BLM, and CDFG, as appropriate, for review and approval. The Licensee shall file the report, including evidence of consultation, with FERC and shall implement those resource management measures required by FERC.

If new occurrences of BLM, special status plant or wildlife species as defined above are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, the licensee shall immediately notify BLM. If BLM determines that the Project-related activities are adversely affecting BLM sensitive or watch list species, the Licensee

shall, in consultation with B L M, as appropriate, develop and implement appropriate protection measures

If new occurrences of state or federally listed or proposed threatened or endangered species are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, the Licensee shall immediately notify BLM, and the relevant Service Agency (United States Fish and Wildlife Service or National Marine Fisheries Service or CDFG) for consultation or conference in accordance with the Endangered Species Act. If state listed or fully protected species are affected, CDFG shall be notified.

Condition No. 15 Project Power Lines and Raptor Collisions

Project Power Lines

Raptor-safe power line design configurations described in Avian Protection on Power Line Interaction Committee's (APLIC) "Suggested Practices for Avian Protection Power Lines: The State of the Art in 2006 (A PL IC 2006) or the most current edition of this A PL IC document, will be used for all new power lines or when replacement of existing poles, phase conductors, and associated equipment is required.

If raptor monitoring performed as Condition No. 15 (Terrestrial Protection Measures, Raptor Collisions) indicates a substantial raptor-transmission line interaction issue, the poles where the interaction issue occurs on BLM land will be replaced or retrofitted, as agreed to via consultation with FWS, BLM, and CDFG.

Raptor Collisions

Licensee shall, beginning in the first full calendar year after license issuance, record annually all incidental observations by Licensee's operations staff of bird collisions/electrocutions at the Bowman-Spaulding Transmission Line. The reported incidental observations shall include the following information: 1) date of observation; 2) location of observation (i.e., nearest pole number); 3) species, if identifiable; 4) number of birds; 5) condition of bird(s) (i.e., dead or injured); 6) suspected cause of injury or death (i.e., electrocution or collision); and 7) was the bird banded and, if so, band number. Licensee shall provide this information for each year to BLM, FWS, and CDFG at least 60 days prior to the Annual Meeting (Condition No. 23).

Condition No. 16 Bald Eagle Management Plan

A Bald Eagle Management Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS, BLM, CDFG, and State Water Board approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 17 Terrestrial Protection Measures Vegetation and Non-Native Invasive Plant Management Plan

Within one year of license issuance, the Licensee shall complete, in consultation with FS, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, and approved by BLM, a single Vegetation and Non-Native Invasive Plant Management (NNIP) Management Plan (Plan) for all NFS lands and BLM administered lands potentially affected by the Project. Targeted NNIP will be those species defined by the California Department of Food and Agriculture (CDFA) rating code, the California Invasive Plant Council (Cal-IPC) rating system, and/ or as FS or BLM species of concern.

The Plan will address Special Status species, terrestrial NNIP species, and revegetation within the Project boundary and adjacent to Project features directly affecting NFS and BLM lands including Project and project related roads, facilities, and distribution and transmission lines. Minimum components of the Plan include, but may not be limited to:

- Special status species management: protection, monitoring, frequency of surveys, internal education, reporting, and adaptive management.
- Sensitive area protection, including guidelines for conducting activities that reduce the effects to sensitive resources.
- Non-native invasive plant (NNIP) species management: frequency of surveys, guidelines for prevention, treatment, internal education, monitoring, reporting, guidelines for conducting weed risk assessment for new project feature development, including an adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.
- Methods that ensure early detection and treatment of NNIP.
- Guidelines for treatment of NNIP populations on Federal lands within the FERC Project boundary. In areas where NNIP populations that are determined to be project-related extend outside the FERC Project boundary, treatments would extend up to 1/4 mile beyond the FERC Project boundary. If noxious weed populations extend more than 1/4 mile from the FERC Project Boundary, and are determined to be Project-related, Licensee will consult with FS or BLM to determine if the populations should be treated and, if so, the appropriate treatment methods. The same treatments are recommended on Licensee lands. Guidelines for conducting Licensee's inspections of equipment and vehicle for NNIPs.
- List of target NNIPs agreed to and approved by BLM and FS.
- Revegetation implementation and monitoring.
- Treatment protocols for vegetation management, hazardous fuels reduction, and hazard tree management for protection of Project facilities and Project-affected resources within the Project affected area.
- Pesticide/herbicide use approval and restrictions.
- Habitat management for specific special-status wildlife species.
- Annual reporting guidelines for the annual consultation meeting.

The Licensee, in consultation with FS and BLM, will review, update, and/or revise the Plan if substantial changes in vegetation management occur. Changes may be implemented if monitoring feedback indicates that resource objectives are not being met.

Any updates to the Plan would be prepared in coordination and consultation with FS and BLM. A minimum of 60 days would be allowed for FS and BLM to comment and make recommendations before the Licensee files the updated plan with the Commission. Licensee would include all relevant documentation of coordination/consultation with the updated Plan filed with the Commission.

Condition No. 18 Fire Management and Response Plan

Within 1 year of license issuance, Licensee shall complete, in consultation with FS, BLM, Cal Fire, potentially affected Tribes, and other interested parties, and approved by BLM, a Fire and Fuels Management Plan (FFMP). The plan shall set forth in detail Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to Project operations. Upon Commission approval, Licensee shall implement the Plan.

Minimum components include, but may not be limited to:

- Fuels Treatment/Vegetation Management: Identification of fire hazard reduction measures and reoccurring maintenance measures to prevent the escape of project-induced fires.
- Fire Prevention and Patrol: Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access. Identify water drafting sites and other fire suppression resources.
- Emergency Response Preparedness: Analyze fire prevention needs including equipment and personnel availability.
- Reporting: Licensee shall report any project related fires immediately to BLM.
- Fire Control/Extinguishing: Provide BLM a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Condition No. 19 - Slope Assessment and Facility Release Point Plan

Licensee shall, within 1 year after license issuance, file with the Commission a plan developed in consultation with FS, BLM, CDFG, and State Water Board and approved by BLM as follows:

- Assessment of landslide hazards by a qualified engineering geologist for slopes above and below open sections of canal and other project facilities. Based on this assessment, conduct slope stability analysis in locations that are considered moderately to highly unstable.
- Assessment of past canal breach areas to determine erosive condition of slopes below these areas. Make recommendations to repair erosive areas that have been damaged by breaches of canal system.

- Conduct an assessment of penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when the release points are used. Consider information collected in the landslide hazard and erosive condition assessments described above when setting priority release points.
- The plan shall include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations.

Licensee shall implement the plan upon approval.

Condition No. 20 Visual Resource Management Plan

Licensee will, in consultation with BLM, finalize the plans provided in the Final License Application and submit for BLM approval. Once the plans are complete, they will be included as part of this condition.

Condition No. 21 Historic Properties Management Plan

Within one year of license acceptance, Licensee shall file with the Commission a Historic Properties Management Plan (HPMP) that is approved by BLM. The HPMP will be tiered to an anticipated Programmatic Agreement (PA), to which BLM requested to be signatories, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. The Licensee shall consult with the State Historic Preservation Officer (SHPO), applicable Native American Tribes, BLM, and other applicable agencies during the finalization of the HPMP. Consultation for the finalization of the HPMP shall consist of field (as appropriate) and office meetings.

If, prior to or during ground disturbance or as a result of Project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on National Forest System or BLM lands, as appropriate, and Licensee adjoining property, the Licensee shall immediately cease work in the area so affected. The Licensee shall then notify BLM, and shall not resume work on ground disturbing activities until it receives written approval from BLM, as appropriate.

If it deems it necessary, BLM may require the Licensee to perform recovery, excavation, and preservation of the site and its artifacts at the Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by BLM, as appropriate.

Condition No. 22 Transportation System Management

Within one year of license issuance, Licensee shall file with the Commission a Transportation System Management Plan, approved by BLM, for protection and maintenance of Project and Project-affected roads that are on or affect BLM lands. The Licensee shall consult with BLM, and other affected parties in the development of this Plan. The Licensee shall take appropriate measures to meet applicable BLM Maintenance Levels, Traffic Service Levels, and Road

Management Objectives (RMOs). Upon Commission approval, Licensee shall implement the Plan.

Project Roads

Table A. below contains the Project Roads and Segments that that are to be included in the Transportation System Management Plan. Table A. includes condition ratings, which are from the Licensee Roads and Trails Study. Within 1 year of license issuance, the Licensee shall improve the roads listed in poor condition to meet BLM standards described below.

Table A. Project Roads

Licensee Road ID Number	Road Name	Forest Service Road ID Number	Ownership	Maintenance Level	Condition	Total Length (mi)
DS053	Deer Creek Spur Rd.	0032-007-07	BLM	N/A	Good	0.07
DS076	Deer Creek Rd.	0032-007	BLM	N/A	Good	0.2

Planning and Inventory

At a minimum, the Transportation System Management Plan shall include the following components.

- Map(s) in electronic format compatible with BLM Travel Management Routes and GIS database showing all Project, Project Recreation and Project-affected roads, culverts, bridges, drainages, watering sources, signs, gates, hazards, sensitive resource areas, erosion features, borrow and disposal sites for surplus rock and soil from road maintenance within and adjacent to the FERC Boundary.
- Table(s) in electronic format identifying uses (e.g. recreation, facility access) of the roads and season of operation, BLM road identification number, Licensee's road identification number, ownership, maintenance level, condition, length, road dimensions, surface type, mile posts, and other identifiers.
- An inventory table in electronic format of all road and road facility conditions including any construction or maintenance needs. Identify each Project Roads and identify how and when it will be addressed further. All road/ segments on Federal Lands listed in poor condition shall be repaired within the 1 year of License issuance.
- A Traffic Safety and Signing Component, including an inventory and condition for existing and proposed traffic/road signs and a schedule for sign maintenance for all Project Roads. Include road identification signage consistent with Motorized Travel Management Direction and directional signage that is prominent and clearly guides the public to and from each recreation facility. The directional signs shall be placed as needed to clearly direct people to and from the Project Facilities and may not be solely on Project Roads. The sign component shall be approved by BLM. The sign component shall meet all current MUTCD and BLM requirements;
- Within 1 year of license issuance Licensee and BLM will review all illegally built user created routes coming off Project Roads or other facilities such as pipelines, ditches, etc. and develop a plan (including a schedule) to rehabilitate and barricade the affected areas.
- Any proposed changes to maintenance levels.

Operation, Maintenance, and Road-Associated Debris

- Develop and submit for BLM approval annual road operation and maintenance (O&M) schedule for Project Roads on BLM lands to comply with BLM standards, specifications, RMOs, BLM Ps including all state requirements, and Travel Management guidelines;
- Complete normal maintenance activities on an annual basis including: road surface maintenance, repair and replacement of damaged culverts, cleaning debris and rock fall from drainage channels, vegetation removal to allow adequate sight distances, vegetation removal to maintain an open traveled way consistent with BLM standards, etc.
- If Licensee proposes to pave any project roads that cross BLM lands, Licensee will need to develop and implement a Pavement Management System, approved by BLM to economically maintain and extend surface condition and guiding in the schedule of repairs. Include repairs in the annual program of work. . Examples of components that will be included in the Pavement Management System are
 - A rating of pavement condition identifying good, fair and poor pavement by a qualified individual
 - Assigning importance ratings for road segments, based on traffic volumes, road functional class, and user demand to guide in priority of work and repairs
 - A schedule of maintenance for good roads to keep them in good condition A schedule of repairs for poor and fair pavements
- Describe types of road-associated debris (e.g. native materials such as dirt, rocks, trees, etc.), any acceptable locations on BLM lands where this material can be stored (identify if temporary only or permanent), and measures to control erosion, weed infestation, etc. on these piles. Remove all road spoil piles not currently located at approved sites on BLM lands to a location either off the BLM lands, or to a BLM approved disposal site.
- Include any required limited operating periods (LOP's) for wildlife species and noxious weed prevention provisions in planning and performing maintenance activities.
- Comply with all State and BLM, specifically BLM Mother Lode FO, guidance and direction for prevention and management of noxious weeds on areas that are on or affect BLM lands.
- Comply with all current BLM O&M guidelines.
- Provide for fish and aquatic passage and proper stream function for all stream crossings that are identified as fish habitat areas.
- When replacing culverts and other stream crossings on BLM lands, Licensee shall adhere to design guidelines appropriate for the BLM level designation for the road.

Construction and Reconstruction

- Develop a road construction and reconstruction implementation schedule to bring existing roads and associated facilities (i.e. culverts, gates, bridges, crossings, cribwalls, barricades, etc.) into compliance with BLM standards that achieve BLM RMOs and Motorized Travel Management Guidelines for Project Roads. The schedule shall ensure that Project Roads are in compliance with these standards within 5 years of completion of the Plan.
- During construction and reconstruction activities, comply with all current BLM O&M.

Monitoring

- Within the first year of license issuance, unless waived by BLM, conduct traffic use surveys approved by BLM. The traffic use survey will be comprised of installing traffic counters at BLM designated locations on Project Roads. Thereafter, conduct traffic surveys every 6 years (coincident with the Commission's recreation Form 80 schedule) at BLM-specified locations, to determine the number and type of vehicles per day, describe study periods and reporting requirements, and determine use trends. Conduct a minimum of 60 survey days during survey years.
- Conduct a road capacity and use review every 6 years following completion of use surveys, to determine if the roads continue to meet current road management objectives. If BLM determines roads no longer comply, define actions and timelines to correct deficiencies;
- Following annual or periodic monitoring, any roads or bridges found to not meet BLM standards and guidelines requiring work beyond normal O&M shall be identified. This list, along with proposed measures to bring the roads or bridges into compliance, shall be submitted to BLM at least 30 days prior to the annual Consultation Meeting required under Condition 23, or as needed.

b. Preliminary 4(e) General Conditions

The following Section 4(e) Conditions include requirements that serve to address the statutory and administrative rights and responsibilities of BLM pursuant to Federal, State, and local laws. These Section 4(e) Conditions should be included in both the YB and DS Projects.

Condition No. 23 Consultation

Licensee shall jointly consult with FS, BLM, CDFG, and State Water Board with regard to each agency's jurisdiction and/or land affected by the Project. The date of the joint consultation meeting will be mutually agreed to by Licensee, and BLM but in general should be held by April 15. At least 30 days in advance of the meeting, Licensee shall notify Nevada Irrigation District (NID) and other interested stakeholders, confirming the meeting location, time and agenda. At the same time, Licensee shall also provide notice to the: United States Department of Agriculture (USFS); United States Fish and Wildlife Service (FWS); (USDI) National Park Service (NPS); United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fishery Service (NMFS); California State Department of Fish and Game (CDFG); and the State Water Resources Control Board (State Water Board) who may choose to participate in the meeting. Licensee shall attempt to coordinate the meeting so interested agencies and other stakeholders may attend.

The Licensee shall make available to FS, BLM, CDFG, and State Water Board at least 2 weeks prior to the meeting, an operations and maintenance plan for the year in which the meeting occurs. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Project area, including progress reports on other resource measures. The goals of this meeting are to share information, mutually agree upon planned maintenance activities, identify concerns that BLM may have regarding activities and their potential effects on sensitive resources,

and any measures required to avoid or mitigate potential effects. In addition, the goal of the meeting shall be to review and discuss the results of implementing the streamflow and reservoir-related conditions, results of monitoring, and other issues related to preserving and protecting ecological values affected by the Project.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions.
- Results of any monitoring studies performed over the previous year in formats agreed to by BLM and the Licensee during development of implementation plans.
- Review of any non-routine maintenance.
- Discussion of any foreseeable changes to Project facilities or features.
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection. Discussion of needed protection measures for newly discovered cultural resource sites.
- Discussion of elements of current year maintenance plans, e.g. road and trail maintenance.
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by the Licensee and shall include any recommendations made by BLM for the protection of BLM land and resources. The Licensee shall file the meeting record, if requested, with FERC no later than 60 days following the meeting.

Copies of other reports related to Project safety and non-compliance shall be submitted to FS, BLM, CDFG, and State Water Board concurrently with submittal to the FERC. These include, but are not limited to: any non-compliance report filed by the Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting BLM lands.

A copy of the record for the previous water year regarding streamflow, study reports, and other pertinent records shall be provided to FS, BLM, CDFG, and State Water Board by Licensee at least 60 days prior to the meeting date, unless otherwise agreed.

Copies of other reports related to monitoring, Project safety and non-compliance on BLM land shall be submitted to BLM concurrently with submittal to the FERC, with the goal of providing the material to BLM no later than 90 days in advance of the annual meeting. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities.

During the first several years of license implementation, it is likely that more consultation than just one annual meeting will be required, given the complexity of these projects. Please see Condition 16.

The BLM reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the Section 4(e) conditions to accomplish protection and utilization of BLM lands and resources.

Condition No. 24 Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect BLM lands the Licensee shall obtain written approval from BLM prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from BLM, and a minimum of 60 days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of BLM for such changes. The Licensee shall file an exact copy of this report with BLM at the same time it is filed with the Commission. This condition does not relieve the Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition No. 25 Maintenance of Improvements on or Affecting Bureau of Land Management Lands

The Licensee shall maintain all its improvements and premises on BLM lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to BLM. Disposal of all materials will be at an approved existing location, except as otherwise agreed by BLM.

Condition No. 26 Existing Claims

The license shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

Condition No. 27 Compliance with Regulations

The Licensee shall comply with the regulations of the Department of Interior for activities on BLM lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting BLM lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 28 Surrender of License or Transfer of Ownership

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to BLM that Licensee shall restore any Project area directly affecting BLM lands to a condition satisfactory to BLM upon or after surrender of the license, as appropriate. To the extent restoration is required; Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such BLM lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall assure that, in a manner satisfactory to BLM, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by BLM to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by BLM, to estimate the potential costs associated with surrender and restoration of any Project area directly affecting BLM lands to BLM specifications. In addition, BLM may require the Licensee to pay for an independent audit of the transferee to assist BLM or FS in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 29 Protection of United States Property

The Licensee, including any agents or employees of the Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this license.

Condition No. 30 Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license.

The Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license.

Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs.

Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 31 Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the Project works or the works appurtenant or accessory thereto under the license. The Licensee's liability for fire and other damages to BLM lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition No. 32 Risks and Hazards on Bureau of Land Management Lands

As part of the occupancy and use of the Project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting BLM lands within the Project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on BLM lands shall be performed after consultation with BLM. In emergency situations, the Licensee shall notify BLM of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not BLM is notified or provides consultation, the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 33 Protection of Bureau of Land Management Special Status Species

Before taking actions to construct new project features on BLM lands that may affect BLM special status species or their critical habitat, the Licensee shall prepare and submit a biological evaluation (BE) for BLM approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, BLM may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition No. 34 Access

Subject to the limitations set forth under the heading of “Access by the United States” in Condition No. 42 hereof, BLM reserves the right to use or permit others to use any part of the licensed area on BLM lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 35 Crossings

The Licensee shall maintain suitable crossings as required by BLM for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition No. 36 Surveys, Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on BLM lands are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of BLM. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 37 Pesticide-Use Restrictions on Bureau of Land Management Lands

Pesticides may not be used on BLM lands or in areas affecting BLM lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of BLM. During the annual Consultation Meeting described in Condition No.23, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide at a minimum the following information essential for review:

- whether pesticide applications are essential for use on BLM lands;
- specific locations of use;
- specific herbicides proposed for use;
- application rates;
- dose and exposure rates; and
- safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Any pesticide use that is deemed necessary to use on BLM lands within 500 feet of known locations of Western Pond Turtles, Sierra Nevada Yellow-Legged Frog, Foothill Yellow Legged Frog, or known locations of BLM Special Status or culturally significant plant populations will be designed to avoid adverse effects to individuals and their habitats. Application of pesticides must be consistent with BLM riparian conservation objectives.

On BLM lands, the Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by BLM and approved through BLM review for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. The Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other BLM required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition No. 16: Terrestrial Protection Measures. Submission of this plan will not relieve the Licensee of the responsibility of annual notification and review.

Condition No. 38 Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

BLM reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

Condition No. 39 Signs

The Licensee shall consult with BLM prior to erecting signs related to safety issues on BLM lands covered by the license. Prior to the Licensee erecting any other signs or advertising devices on BLM lands covered by the license, the Licensee must obtain the approval of BLM as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

Condition No. 40 Ground Disturbing Activities

If the Licensee proposes ground-disturbing activities on or directly affecting BLM lands that were not specifically addressed in the Commission's NEPA processes, the Licensee, in consultation with BLM, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon BLM request, the Licensee shall enter into an agreement with BLM under which the Licensee shall fund a reasonable portion of BLM staff time and expenses for staff activities related to the proposed activities time and expenses for staff activities related to the proposed activities.

Condition No. 41 Use of Bureau of Land Management Roads for Project Access

The Licensee shall obtain suitable authorization for all project access roads and BLM roads needed for Project access. The term of the permit shall be the same as the term of the license. The authorization shall require road maintenance and cost sharing in reconstruction commensurate with the Licensee's use and project-related use. The authorization shall specify road maintenance and management standards that provide for traffic safety, minimize erosion, and damage to natural resources and that are acceptable to BLM as appropriate.

The Licensee shall pay BLM for its share of maintenance cost or perform maintenance or other agreed to services, as determined by BLM for all use of roads related to project operations, project-related public recreation, or related activities. The maintenance obligation of the Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by the Licensee shall be authorized by and shall be performed in accordance with an approved maintenance plan and applicable BLMs. In the event a road requires maintenance, restoration, or reconstruction work to accommodate the Licensee's needs, the licensee shall perform such work at its own expense after securing BLM authorization.

The Licensee shall complete a condition survey and a proposed maintenance plan subject to BLM review and approval as appropriate once each year. The plan may take the format of a road maintenance agreement provided all the above conditions are met as well as the conditions set forth in the proposed agreement.

In addition, all BLM roads used as Project Access roads (PAR) and Right-of-Way access roads (ROW) shall have:

- Current condition survey.
- Be mapped at a scale to allow identification of specific routes or segments.
- BLM assigned road numbers are used for reference on the maps, tables, and in the field.
- GIS compatible files of GPS alignments of all roads used for Project access are provided to BLM.
- Adequate signage is installed and maintained by the Licensee at each road or route, identifying the road by BLM road number.

Condition No. 42 Access By The United States

The United States shall have unrestricted use of any road over which the Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of costs disproportionate to the Licensee's use in comparison to the use of the road by others

Condition No. 43 Road Use

The Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Transportation System Management Plan (Condition 21). BLM, as appropriate, reserve the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require construction/construction by the Licensee to the extent needed to accommodate the Licensee's use. BLM agree to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 44 Bureau of Land Management Approval of Final Design

Before any new construction of the Project occurs on Bureau of Land Management lands, the Licensee shall obtain prior written approval of BLM for all final design plans for Project components, which BLM deems as affecting or potentially affecting Bureau of Land Management lands within the Project boundary. The Licensee shall follow the schedules and

procedures for design review and approval specified in the conditions herein. As part of such written approval, BLM may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by BLM based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed by BLM, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the license. Any changes to the license made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Interior made pursuant to Section 4(e) of the Federal Power Act to address Project effects within the Project boundary.

Condition No. 45 Unattended Construction Equipment

The Licensee shall not place construction equipment on BLM lands prior to actual use or allow it to remain on BLM lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by BLM.

Condition No. 46 Maintenance of Improvements

The Licensee shall maintain the improvements and premises on BLM lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to BLM. Disposal of all materials will be at an approved existing location, except as otherwise agreed to by BLM.

Condition No. 47 Construction Inspections

Within 60 days of planned ground-disturbing activity on or affecting BLM lands, Licensee shall file with the Commission a Safety During Construction Plan that identifies potential hazard areas and measures necessary to address public safety. Areas to consider include construction activities near public roads, trails, and recreation areas and facilities.

Licensee shall perform daily (or on a schedule otherwise agreed to by BLM in writing) inspections of Licensee's construction operations on BLM lands and Licensee adjoining property while construction is in progress. Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to BLM on a schedule agreed to by BLM. The inspections must specifically include fire plan compliance, public safety, and environmental protection. Licensee shall act immediately to correct any items found to need correction.

A registered professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements on a schedule approved by BLM.

Condition No. 48 Licensee Contact

Licensee shall provide a contact with BLM, whenever planning or construction of recreation facilities, other Project improvements, and routine and other maintenance activities are taking

place within the BLM lands. Licensee agrees to cooperate with BLM through this individual in contract review and work inspection.

Condition No. 49 Hazardous Substances Plan

Within 1 year of license issuance or prior to undertaking activities on BLM lands, Licensee shall file with the Commission a plan approved by BLM for oil and hazardous substances storage and spill prevention and cleanup. The plan shall show evidence of consultation with State Water Board, CDFG, and the Regional Water Quality Control Board (RWQCB). In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, Licensee shall notify BLM, and in consultation with State Water Board, CDFG, and RWQCB, BLM shall make a determination whether a plan approved by BLM for oil and hazardous substances storage and spill prevention and cleanup is needed. Any such plan shall be filed with the Commission.

At a minimum, the plan must require Licensee to (1) maintain in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project; (2) to periodically inform BLM of the location of the spill cleanup equipment on BLM lands and of the location, type, and quantity of oil and hazardous substances stored in the project area; and (3) to inform BLM immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan shall include a monitoring plan that details corrective measures that will be taken if spills occur. The plan shall include a requirement for a weekly written report during construction documenting the results of the monitoring.

Condition No. 50 Erosion and Sediment Control and Management

Within 1 year of license issuance, Licensee shall file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with BLM and other interested parties, and approved by BLM that will provide direction for treating erosion and controlling sedimentation within the Project and Project-affected BLM lands during the term of the new license. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in the referenced by this condition, unless otherwise agreed to by BLM during Plan finalization. Minimum components include, but may not be limited to:

Erosion Control Guidelines for Existing Project-Affected Areas

- Methods for initial and periodic inventory and monitoring of the entire Project area and Project-affected BLM lands to identify erosion sites and assess site condition for each. Periodic monitoring and inventory will include recording effectiveness of erosion treatment measures, and identification of new erosion sites for the term of the new license.
- Criteria for ranking and treating erosion sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site.

- Erosion control measures that incorporate current standards, follow BLM regulations and guidance (e.g. LRMP, RMOs, BMPs), are customized to site-specific conditions, and approved by FS.
- Develop and implement a schedule for treatment (e.g. repair, mitigate, monitor) of erosion sites, including a list of sites requiring immediate mitigation and schedule for their implementation.
- Effectiveness monitoring of completed erosion control treatment measures after treatment in order to determine if further erosion control measures are needed. If erosion control measures are not effective, Licensee will implement additional erosion control measures approved by BLM and continue monitoring until the site has stabilized.
- Protocols for emergency erosion and sediment control.
- Process for documenting and reporting inventory and monitoring results including periodic plan review and revision. Documentation shall include a BLM compatible GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results.

Erosion Control Guidelines for New Construction or Non-Routine Maintenance

Licensee shall develop site-specific temporary erosion control measures for each project to be approved by FS. These temporary measures will prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent measures.

Appendix H-3

Bureau of Reclamation 4(e) Conditions: Drum-Spaulding Project

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A-1 – Reservation of Authority to Modify Conditions

Reclamation reserves the authority to modify these Section 4(e) FPA conditions, as necessary, to respond to any changes to the license application approved by FERC, any Certificate issued by the SWRCB for this Project, or any other new, relevant information.

Condition No. b.1 – Consultation

The Licensee shall, beginning the first full calendar year after license issuance, participate in annual meetings with Reclamation and State Parks to present operation and maintenance (O&M) activities, associated with Newcastle Powerhouse and premises, planned for the next calendar year. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Newcastle Powerhouse and premises, including progress reports on other resource measures. The goals of the meeting are to share information as mutually agreed upon for planned maintenance activities, and identify concerns that Reclamation and State Parks may have regarding O&M activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate potential effects.

The date of the consultation meeting(s) will be mutually agreed upon by the Licensee, Reclamation, and State Parks. Representatives from the Service, CDFG, SWRCB, or other interested agency representatives concerned with O&M of the Newcastle Powerhouse may request to attend the meeting.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions;
- Results of any monitoring studies performed over the previous year in formats agreed to by Reclamation and State Parks and PG&E during development of study plans;
- Review of any non-routine maintenance;
- Discussion of any foreseeable changes to Newcastle Powerhouse facilities and/or its appurtenances;
- Discussion of any necessary revisions or modifications to plans approved as part of PG&E's FERC license pertaining to Newcastle Powerhouse;
- Discussion of elements of current year maintenance plans, e.g., road maintenance; and
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by Licensee and shall include any recommendations made by Reclamation and State Parks for the protection of Reclamation lands, water bodies, and resources. Copies of other reports related to safety and security at Newcastle Powerhouse shall be submitted to Reclamation concurrently with submittal to the FERC. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting Reclamation lands, water bodies, and resources.

Condition No. b.2 – Approval of Changes

Notwithstanding any license authorization to make changes to the Newcastle Powerhouse and premises, Licensee shall obtain written approval from Reclamation prior to making any changes or in the uses of Reclamation lands, water bodies, and resources. Following receipt of such approval from Reclamation, and a minimum of 90-days prior to initiating any such changes, Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of Reclamation for such changes. Licensee shall file an exact copy of the report with Reclamation at the same time it is filed with the Commission.

Condition No. b.3. – O&M of Newcastle Powerhouse and Appurtenances

Licensee shall operate and maintain the Newcastle Powerhouse and premises and appurtenances in a good and safe condition and to the reasonable satisfaction of Reclamation at the expense of Licensee. Licensee shall at all times exercise its rights herein in accordance with all applicable statutes, orders, rules and regulations of any public authority having jurisdiction, including but not limited to all those related to or concerned with the environment. Licensee shall, from time to time, upon reasonable request from Reclamation promptly repair or alter any part of Licensee's facilities to preclude damage to Reclamation facilities, and Licensee shall perform all such repair or alteration without regard to the cause, to the extent not inconsistent with other agreements, except where caused or necessitated by an act or omission of the United States. This provision shall not, however, relieve Licensee from the duty of inspecting and keeping its facilities in a proper and safe condition without the request of Reclamation, nor place upon Reclamation the duty of inspecting or maintaining any of the facilities installed by or for Licensee.

Condition No. b.4. – Surrender of License or Transfer of Ownership

Licensee's license shall not construed as granting to the Licensee any right, title, or interest in lands or water bodies of the United States. Prior to surrender of this license, the Licensee shall provide assurance acceptable to Reclamation that Licensee shall restore the Newcastle Powerhouse premises to a condition satisfactory to Reclamation upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such Reclamation lands and waters and shall include or identify adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall assure that, in a manner satisfactory to Reclamation, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by Reclamation to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by Reclamation, to estimate the potential costs associated with surrender and restoration of the premises to Reclamation specifications. In addition, the Licensee shall, if requested by Reclamation, pay for an independent audit of the transferee to assist Reclamation in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. b.5. – Protection of United States Property

The Licensee and its contractors shall execute and maintain their work so as to avoid injury or damage to any person or property. All work shall be done in conformance with all Federal, State, and local health and safety regulations and laws.

Condition No. b.6 – Indemnification and Hold Harmless

The Licensee agrees to indemnify and hold harmless the United States and State Parks, its employees, agents, and assigns from any loss or damage and from any liability on account of personal injury, property damage, or claims for personal injury or death arising out of the Licensee's activities under this agreement. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer, or termination.

Condition No. b.7. – Damage to Land, Property, and Interests of the United States

Licensee shall repair any damages it causes to the property or equipment of Reclamation and State Parks. No waste materials of any kind shall be left on United States property. Any damage to lands or facilities of the United States shall be restored to the reasonable satisfaction of Reclamation.

Condition No. b.8. – Unrestricted Access

The United States reserves the right of its officers, agents and employees at all times to have unrestricted access and ingress to, passage over, and egress from all of said lands, to make investigations of all kinds, dig test pits and drill test holes, to survey for and construct reclamation and irrigation works and other structures incident to Federal Reclamation Projects, or for any purpose whatsoever. Reclamation will make every reasonable effort to keep damages to a minimum.

Condition No. b.9. – Pesticide-Use Restrictions on Reclamation Lands

The Licensee shall not permit the use of any pesticides on Federal lands without prior written approval by Reclamation. The Licensee shall submit to Reclamation for approval an Integrated Pest Management Plan sixty (60) days in advance of pesticide application.

All pesticides used shall be in accordance with the current registration, label direction, or other directives regulating their use (State Department of Agriculture, Department of Ecology, Occupational Safety and Health Administration, etc.) and with applicable Reclamation policy and directives and standards. Applicators will meet applicable State training or licensing

requirements. Records maintenance shall be in accordance with State requirements and such records shall be furnished to Reclamation not later than five (5) working days after any application of a pesticide.

Any equipment, tools, and machines used for pesticide application shall be in good repair and suitable for such use. Equipment shall be calibrated prior to the spraying season and as deemed necessary by Reclamation.

Mixing, disposal, and cleaning shall be done where pesticides residues cannot enter storm drains, sewers, or other non-target areas.

The Licensee shall initiate any necessary measures for containment and clean up of pesticide spills. Spills shall be reported to Reclamation with full details of the actions taken. Reporting may be within a reasonable time period. A reasonable time period means: within twenty-four (24) hours of the spill if it is an emergency or by the first working day if it is a nonemergency.

An emergency is any situation that requires immediate action to reduce or avoid endangering public health and safety or the environment.

Aerial application of pesticides is prohibited without prior written consent by Reclamation's designated representative.

The Licensee agrees to include the provisions contained in this Condition (No. B.9.) in any subcontract or third party contract it may enter into pursuant to these conditions.

Condition No. b.10. – Hazardous Materials

The Licensee may not allow contamination or pollution of Federal lands, waters or facilities and shall take reasonable precautions to prevent such contamination or pollution by third parties. Substance causing contamination or pollution shall include but are not limited to hazardous materials, thermal pollution, refuse, garbage, sewage effluent, industrial waste, petroleum products, mine tailings, mineral salts, misused pesticides, pesticide containers, or any other pollutants.

The Licensee shall comply with all applicable Federal, state and local laws and regulations, and Reclamation policies and directives and standards, existing or hereafter enacted or promulgated, concerning any hazardous material that will be used, produced, transported, stored, or disposed of on or in Federal lands, waters or facilities.

“Hazardous material” means any substance, pollutant, or contaminant listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9601, et seq., and the regulations promulgated pursuant to the Act.

Upon discovery of any event which may or does result in contamination or pollution of Federal lands, waters or facilities, the Licensee shall initiate any necessary emergency measures to protect health, safety and the environment and shall report such discovery and full details of the

actions taken to the Reclamation Authorized Official. Reporting may be within a reasonable time period. A reasonable time period means: within twenty-four (24) hours of the time of discovery if it is an emergency or by the first working day if it is a non-emergency. An emergency is any situation that requires immediate action to reduce or avoid endangering public health and safety or the environment.

Violation of any of the provisions of this Article, as determined by the Reclamation, may constitute grounds for Reclamation to request termination of the FERC License. Such violations require immediate corrective action by the licensee, and shall make the licensee, liable for the cost of full and complete remediation and/or restoration of any Federal resources or facilities that are adversely affected as a result of the violation.

The Licensee agrees to include the provisions contained in paragraphs (a) through (e) of this Article in any subcontract or third party contract it may enter into pursuant to this contract.

Reclamation agrees to provide information necessary for the Licensee using reasonable diligence, to comply with the provisions of this Article.

Condition No. b.11 – Discovery of Cultural Resources

The Licensee shall immediately provide an oral notification to Reclamation's authorized official of the discovery of any and all antiquities, and paleontological items, or other objects of archaeological, cultural, historic, or scientific interest on Reclamation lands. The Licensee shall follow up with a written report of their finding(s) to Reclamation's authorized official within forty-eight (48) hours. Objects under consideration include, but are not limited to, historic or prehistoric ruins, human remains, funerary objects, and artifacts discovered as a result of activities under this authorization.

Condition No. b.12 – Health and Safety

The Licensee and its contractors shall execute and maintain their work so as to avoid injury or damage to any person or property. All work shall be done in conformance with all Federal, State and local health and safety regulations and laws.

Condition No. b.13 – Reclamation Land Use Stipulation

There is reserved from the rights granted in new license, the prior rights of the United States acting through the Bureau of Reclamation, Department of the Interior, to construct, operate, and maintain public works now or hereafter authorized by the Congress in association with the American River Division of the CVP, consistent with applicable Federal law and policies, during the term of the new license.

Condition No. b.14. – Removal of Structures

The Licensee shall not abandon personal property of any kind, including project works, in or on Reclamation facilities, lands, or water bodies. Upon the surrender, expiration, termination, or revocation of the FERC license, the Licensee shall coordinate with Reclamation on the removal

of all structures, equipment, or other improvements made by the Licensee. The Licensee shall bear the burden of any such costs. The United States will not incur any costs associated with the removal of improvements and/or site restoration activities within the license premises on Federal lands owned by Reclamation.

Appendix I

4(e) Conditions: Yuba-Bear Project

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Appendix I-1

Forest Service 4(e) Conditions: Yuba-Bear Project

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Revised
Forest Service Preliminary Conditions and Recommendations
Provided Under 18 CFR § 4.34 (b)(1)
In Connection with the Application for Relicensing for the
Yuba-Bear Hydroelectric Project
(FERC No. 2266)

23 August 2012

INTRODUCTION

On July 31, 2012, the USDA Forest Service (FS) provided Preliminary Section 4(e) conditions for the Yuba-Bear Hydroelectric Project, FERC No. 2266, in accordance with 18 CFR 4.34(b)(1)(i). After those conditions were filed, the Forest Service participated in several meetings and discussions with the Licensee, other resource agencies, and nongovernmental organizations in an effort to reach agreement on conditions that one entity or another had concerns with. Based on these meetings and discussions, the Forest Service submits the following revised Preliminary Section 4(e) conditions for the Yuba- Bear Hydroelectric Project, FERC No. 2266. Please note that conditions that are not referenced in the following document have not changed from our original filing of July 31, 2012. Please also note that changes are shown in redline.

The USDA Forest Service (FS) provides the following Preliminary Section 4(e) conditions for the Yuba-Bear Hydroelectric Project, FERC No. 2266, in accordance with 18 CFR 4.34(b)(1)(i). Section 4(e) of the Federal Power Act (FPA), which states the Commission may issue a license for a project within a reservation only if it finds that the License will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. This is an independent threshold determination made by FERC, with the purpose of the reservation defined by the authorizing legislation or proclamation (see *Rainsong v. FERC*, 106 F.3d 269 (9th Cir. 1977)). FS, for its protection and utilization determination under Section 4(e) of the FPA, may rely on broader purposes than those contained in the original authorizing statutes and proclamations in prescribing conditions (see *Southern California Edison v. FERC*, 1 16F.3d 507 (D.C. Cir. 1997)).

The following terms and conditions are based on those resource and management requirements enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved by Land and Resource Management Plans prepared in accordance with the National Forest Management Act. Specifically, the 4(e) conditions in this document are based on the Land and Resource Management Plans (as amended) for the Eldorado and Tahoe National Forests, as approved by the Regional Forester of the Pacific Southwest Region.

Pursuant to Section 4(e) of the Federal Power Act, the Secretary of Agriculture, acting by and through FS, considers the following conditions necessary for the adequate protection and utilization of the land and resources of the Tahoe National Forest. License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 (revised October 1975) issued by Order No. 540, dated October 31, 1975, cover general requirements. Part I of this document includes administrative conditions deemed necessary for the administration of National Forest System (NFS) lands. Part II of this document includes specific resource requirements for protection and utilization of NFS lands.

PART I: ADMINISTRATIVE CONDITIONS

Condition No. 1 – Consultation

Licensee shall annually consult with the United States Department of Agriculture, FS (FS). The date of the consultation meeting will be mutually agreed to by Licensee and FS but in general should be held by April 15. At least 30 days in advance of the meeting, Licensee shall notify Nevada Irrigation District (NID) and other interested stakeholders, confirming the meeting location, time and agenda. At the same time, Licensee shall also provide notice to United States Department of Interior (USDI) Bureau of Land Management (BLM), USDI Fish and Wildlife Service (FWS), and USDI National Park Service; California State Department of Fish and Game (CDFG) and State Water Resources Control Board (State Water Board); United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fishery Service (NMFS), who may choose to participate in the meeting. Licensee shall attempt to coordinate the meeting so interested agencies and other stakeholders may attend.

Licensee shall make available to FS, BLM, CDFG, and State Water Board at least 2 weeks prior to the meeting, an operations and maintenance plan for the year in which the meeting occurs. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Project area, including progress reports on other resource measures. The goals of this meeting are to share information, mutually agree upon planned maintenance activities, identify concerns that FS may have regarding activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate potential effects. In addition, the goal of the meeting shall be to review and discuss the results of implementing the streamflow and reservoir-related conditions, results of monitoring, and other issues related to preserving and protecting ecological values affected by the Project.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions.
- Results of any monitoring studies performed over the previous year in formats agreed to by FS and Licensee during development of implementation plans.
- Review of any non-routine maintenance.
- Discussion of any foreseeable changes to Project facilities or features.
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species, or to incorporate new knowledge about a species requiring protection. Discussion of needed protection measures for newly discovered cultural resource sites.
- Discussion of elements of current year maintenance plans, e.g. road and trail maintenance.
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by Licensee and shall include any recommendations made by FS for the protection of NFS lands and resources. Licensee shall file the meeting record, if requested, with FERC no later than 60 days following the meeting.

Copies of other reports related to Project safety and non-compliance shall be submitted to FS, BLM, CDFG, State Water Board, and other interested agencies and stakeholders concurrently with submittal to the Commission. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting NFS lands.

A copy of the record for the previous water year regarding streamflow, study reports, and other pertinent records shall be provided to FS, BLM, CDFG, State Water Board, and other interested agencies and stakeholders by Licensee at least 60 days prior to the meeting date, unless otherwise agreed.

Copies of other reports related to monitoring, Project safety, and non-compliance on NFS lands shall be submitted to FS concurrently with submittal to the Commission, with the goal of providing the material to FS no later than 90 days in advance of the Annual Meeting. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities.

During the first several years of license implementation, it is likely that more consultation than just one Annual Meeting will be required, given the complexity of these projects.

FS reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the Section 4(e) conditions to accomplish protection and utilization of NFS lands and resources.

Condition No. 2 - FS Approval of Final Design

Before any new construction of the Project occurs on National Forest System lands, Licensee shall obtain prior written approval of FS for all final design plans for Project components, which FS deems as affecting or potentially affecting National Forest System resources. Licensee shall follow the schedules and procedures for design review and approval specified in the conditions herein. As part of such written approval, FS may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by FS based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed necessary by FS, the Commission, or Licensee to be a substantial change, Licensee shall follow the procedures of FERC Standard Article 2 of the license. Any changes to the license made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the Federal Power Act.

Condition No. 3 - Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect NFS lands, Licensee shall obtain written approval from FS prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from FS, and a minimum of 60 days prior to initiating any such changes, Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of FS for such changes. Licensee shall file an exact copy of this report with FS at the same time it is filed with the Commission. This condition does not relieve Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition No. 4 - Maintenance of Improvements on or Affecting National Forest System or Bureau of Land Management Lands

Licensee shall maintain all its improvements and premises on NFS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to FS. Disposal of all materials will be at an approved existing location, except as otherwise agreed by FS.

Condition No. 5 - Existing Claims

License shall be subject to all valid claims and existing rights of third parties. The United States is not liable to Licensee for the exercise of any such right or claim.

Condition No. 6 - Compliance with Regulations

Licensee shall comply with the regulations of the Department of Agriculture for activities on National Forest System lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting National Forest System lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 7 - Surrender of License or Transfer of Ownership

Prior to any surrender of this license, Licensee shall provide assurance acceptable to FS that Licensee shall restore any project area directly affecting National Forest System lands to a condition satisfactory to FS upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such National Forest System lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the project, Licensee shall assure that, in a manner satisfactory to FS, Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by FS to assist it in evaluating Licensee's proposal, Licensee shall conduct an analysis, using experts approved by FS, to estimate the potential costs associated with

surrender and restoration of any project area directly affecting National Forest System lands to FS specifications. In addition, FS may require Licensee to pay for an independent audit of the transferee to assist FS in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 8 - Protection of United States Property

Licensee, including any agents or employees of Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this license.

Condition No. 9 – Indemnification

Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 10 - Damage to Land, Property, and Interests of the United States

Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from Licensee's construction, maintenance, or operation of the project works or the works appurtenant or accessory thereto under the license. Licensee's liability for fire and other damages to National Forest System lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition No. 11 - Risks and Hazards on National Forest System Lands

As part of the occupancy and use of the project area, Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly

affecting National Forest System lands within the project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on National Forest System lands shall be performed after consultation with FS. In emergency situations, Licensee shall notify FS of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not FS is notified or provides consultation; Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 12 – Protection of FS Special Status Species

Before taking actions to construct new project features on NFS lands that may affect FS special status species or their critical habitat, Licensee shall prepare and submit a biological evaluation (BE) for FS approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, FS may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition No. 13 – Access

Subject to the limitations set forth under the heading of “Access by the United States” in Condition No. 21 hereof, FS reserves the right to use or permit others to use any part of the licensed area on NFS lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 14 – Crossings

Licensee shall maintain suitable crossings as required by FS for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition No. 15 - Surveys, Land Corners

Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on National Forest System lands are destroyed by an act or omission of Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2)

the specifications of the County Surveyor, or (3) the specifications of FS. Further, Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 16 - Pesticide-Use Restrictions on National Forest System Lands

Pesticides may not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of FS. During the Annual Meeting described in Condition No. 1, Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. Licensee shall provide at a minimum the following information essential for review:

- Whether pesticide applications are essential for use on NFS lands;
- Specific locations of use;
- Specific herbicides proposed for use;
- Application rates;
- Dose and exposure rates; and
- Safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Any pesticide use that is deemed necessary to use on NFS lands within 500 feet of known locations of Western Pond Turtles, Sierra Nevada Yellow-Legged Frog, Foothill Yellow Legged Frog, or known locations of FS Special Status or culturally significant plant populations will be designed to avoid adverse effects to individuals and their habitats. Application of pesticides must be consistent with FS riparian conservation objectives.

On NFS lands, Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by FS and approved through FS review for the specific purpose planned. Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other FS required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition No. 34: Vegetation and Non-Native Invasive Plant Management Plan. Submission of this plan will not relieve Licensee of the responsibility of annual notification and review.

Condition No. 17 - Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

FS reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

Condition No. 18 – Signs

Licensee shall consult with FS prior to erecting signs related to safety issues on NFS lands covered by the license. Prior to Licensee erecting any other signs or advertising devices on NFS lands covered by the license, Licensee must obtain the approval of FS as to location, design, size, color, and message. Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

Condition No. 19 – Ground Disturbing Activities

If Licensee proposes ground-disturbing activities on or directly affecting NFS lands that were not specifically addressed in the Commission's NEPA processes, Licensee, in consultation with FS, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon FS request, Licensee shall enter into an agreement with FS under which Licensee shall fund a reasonable portion of FS staff time and expenses for staff activities related to the proposed activities.

Condition No. 20 – Use of National Forest System Roads for Project Access

Licensee shall obtain suitable authorization for all project access roads and NFS roads needed for Project access. The authorization shall require road maintenance and cost sharing in reconstruction commensurate with Licensee's use and project-related use. The authorization shall specify road maintenance and management standards that provide for traffic safety, minimize erosion, and damage to natural resources and that are acceptable to FS as appropriate.

Licensee shall pay FS for its share of maintenance cost or perform maintenance or other agreed to services, as determined by FS for all use of roads related to project operations, project-related public recreation, or related activities. The maintenance obligation of Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by Licensee shall be authorized by and shall be performed in accordance with an approved maintenance plan and applicable Best Management Practices (BMPs). In the event a road requires maintenance, restoration, or reconstruction work to accommodate Licensee's needs, Licensee shall perform such work at its own expense after securing FS authorization.

Licensee shall complete a condition survey and a proposed maintenance plan subject to FS review and approval as appropriate once each year. The plan may take the format of a road maintenance agreement provided all the above conditions are met as well as the conditions set forth in the proposed agreement.

In addition, all NFS roads used as Project Access roads (PAR) and Right-of-Way access roads (ROW) shall have:

- Current condition survey.
- Be mapped at a scale to allow identification of specific routes or segments.
- FS assigned road numbers are used for reference on the maps, tables, and in the field.

- GIS compatible files of GPS alignments of all roads used for Project access are provided to FS.
- Adequate signage is installed and maintained by Licensee at each road or route, identifying the road by FS road number.

Condition No. 21 - Access By The United States

The United States shall have unrestricted use of any road over which Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause Licensee to bear a share of costs disproportionate to Licensee's use in comparison to the use of the road by others.

Condition No. 22 - Road Use

Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Transportation System Management Plan (refer to Condition No. 44). FS reserves the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require reconstruction/construction by Licensee to the extent needed to accommodate Licensee's use. FS agrees to provide notice to Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 23 - Hazardous Substances Plan

Within 1 year of license issuance or prior to undertaking activities on NFS lands, Licensee shall file with the Commission a plan approved by FS for oil and hazardous substances storage and spill prevention and cleanup. The plan shall show evidence of consultation with State Water Board, CDFG, and the Regional Water Quality Control Board (RWQCB). In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, Licensee shall notify FS, and in consultation with State Water Board, CDFG, and RWQCB, FS shall make a determination whether a plan approved by FS for oil and hazardous substances storage and spill prevention and cleanup is needed. Any such plan shall be filed with the Commission.

At a minimum, the plan must require Licensee to (1) maintain in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project; (2) to periodically inform FS of the location of the spill cleanup equipment on NFS lands and of the location, type, and quantity of oil and hazardous substances stored in the project area; and (3) to inform FS immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan shall include a monitoring plan that details corrective measures that will be taken if spills

occur. The plan shall include a requirement for a weekly written report during construction documenting the results of the monitoring.

Condition No. 24 - Construction Inspections

Within 60 days of planned ground-disturbing activity on or affecting NFS lands, Licensee shall file with the Commission a Safety During Construction Plan that identifies potential hazard areas and measures necessary to address public safety. Areas to consider include construction activities near public roads, trails, and recreation areas and facilities.

Licensee shall perform daily (or on a schedule otherwise agreed to by FS in writing) inspections of Licensee's construction operations on NFS lands and Licensee adjoining property while construction is in progress. Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to FS on a schedule agreed to by FS. The inspections must specifically include fire plan compliance, public safety, and environmental protection. Licensee shall act immediately to correct any items found to need correction.

A registered professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements on a schedule approved by FS.

Condition No. 25 - Unattended Construction Equipment

Licensee shall not place construction equipment on NFS lands prior to actual use or allow it to remain on NFS lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by FS.

Conditions No. 26 – Slope Assessment and Facility Release Access Plan

Licensee shall, within 1 year after license issuance, file with the Commission a plan developed in consultation with FS, BLM, CDFG, and State Water Board and approved by FS as follows:

- Assessment of landslide hazards by a qualified engineering geologist for slopes above and below open sections of canal and other project facilities. Based on this assessment, conduct slope stability analysis in locations that are considered moderately to highly unstable.
- Assessment of past canal breach areas to determine erosive condition of slopes below these areas. Make recommendations to repair erosive areas that have been damaged by breaches of canal system.
- Conduct an assessment of penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when the release points are used. Consider information collected in the landslide hazard and erosive condition assessments described above when setting priority release points.
- The plan shall include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations.

Licensee shall implement the plan upon approval.

Condition No. 27 – Erosion and Sediment Control and Management

Within 1 year of license issuance, Licensee shall file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with FS and other interested parties, and approved by FS that will provide direction for treating erosion and controlling sedimentation within the Project and Project-affected NFS lands during the term of the new license. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in the referenced by this condition, unless otherwise agreed to by FS during Plan finalization. Minimum components include, but may not be limited to:

Erosion Control Guidelines for Existing Project-Affected Areas

- Methods for initial and periodic inventory and monitoring of the entire Project area and Project-affected NFS lands to identify erosion sites and assess site condition for each. Periodic monitoring and inventory will include recording effectiveness of erosion treatment measures, and identification of new erosion sites for the term of the new license.
- Criteria for ranking and treating erosion sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site.
- Erosion control measures that incorporate current standards, follow FS regulations and guidance (e.g. LRMP, RMOs, BMPs), are customized to site-specific conditions, and approved by FS.
- Develop and implement a schedule for treatment (e.g. repair, mitigate, monitor) of erosion sites, including a list of sites requiring immediate mitigation and schedule for their implementation.
- Effectiveness monitoring of completed erosion control treatment measures after treatment in order to determine if further erosion control measures are needed. If erosion control measures are not effective, Licensee will implement additional erosion control measures approved by FS and continue monitoring until the site has stabilized.
- Protocols for emergency erosion and sediment control.
- Process for documenting and reporting inventory and monitoring results including periodic plan review and revision. Documentation shall include a FS compatible GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results.

Erosion Control Guidelines for New Construction or Non-Routine Maintenance

Licensee shall develop site-specific temporary erosion control measures for each project to be approved by FS. These temporary measures will prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent measures.

PART II: RESOURCE CONDITIONS

Condition No. 28 – General Resource Measures

Annual Employee Training

Licensee shall, beginning in the first full calendar year after license issuance, annually perform employee awareness training and shall also perform such training when a staff member is first assigned to the Project. The goal of the training shall be to familiarize Licensee's operations and maintenance (O&M) staff with special-status species, noxious weeds and sensitive areas (e.g., special-status plant populations and noxious weed populations) that are known to occur within or adjacent to the FERC Project Boundary on NFS lands, and the procedures for reporting to each agency, as appropriate, to comply with the license requirements. It is not the intent of this measure that Licensee's O&M staff perform surveys or become specialists in the identification of special-status species or noxious weeds. Licensee shall direct its O&M staff to avoid disturbance to sensitive areas, and to advise all Licensee contractors to avoid sensitive areas. If Licensee determines that disturbance of a sensitive area is unavoidable, Licensee shall consult with FS to minimize adverse effects to sensitive resources. This measure applies to employee training that is not otherwise covered by a specific plan.

Coordinated Operations Plan

Licensee shall, within 90 days after issuance of new licenses for the Yuba-Bear Hydroelectric Project or Drum-Spaulding Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan (Plan). Licensee shall develop the Plan in consultation with Licensee for the Drum-Spaulding Project. The purpose of the Plan shall be to provide for coordination between the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project to assure implementation of flow-related measures in the two project licenses. Licensee shall file the Plan, with evidence of consultation as the Plan relates to compliance with flow-related measures, with FS, BLM, CDFG, and State Water Board, and Licensee of the Drum-Spaulding Project, with the Commission and Licensee shall implement those portions of the Plan approved by the Commission.

Condition No. 29 - Flow Measures

Water Year Types

Within 90 days of license issuance, Licensee shall in each year in each of the months of February, March, April, May and October determine water year type as described in Table 1 of this measure. Licensee shall use this determination in implementing articles and conditions of the license that are dependent on water year type. Water year types shall be defined as:

Table 1. Water Year types for the Yuba-Bear Project.

Water Year Type	DWR Forecast of Total Unimpaired Runoff in the Yuba River at Smartville in Thousand Acre-Feet or DWR Full Natural Flow Near Smartville for the Water Year in Thousand Acre-Feet ¹
Extreme Critically Dry	Equal to or Less than 615
Critically Dry	616 to 900
Dry	901 to 1,460
Below Normal	1,461 to 2,190
Above Normal	2,191 to 3,240
Wet	Greater than 3,240

¹ DWR rounds the Bulletin 120 forecast to the nearest 1,000 acre-feet. The Full Natural Flow is provided to the nearest acre-foot, and Licensee will round DWR's Full Natural Flow to the nearest 1,000 acre-feet.

In each of the months of February, March, April and May, the water year type shall be based on California Department of Water Resources (DWR) water year forecast of unimpaired runoff in the Yuba River at Smartville as set forth in DWR's Bulletin 120 entitled "Water Year Conditions in California." DWR's forecast published in February, March and April shall apply from the 15th day of that month to the 14th day of the next month. From May 15 through October 14, the water year type shall be based on DWR's forecast published in May.

From October 15 through February 14 of the following year, the water year type shall be based on the sum of DWR's monthly (not daily) full natural flow for the full water year for the Yuba River near Smartville as made available by DWR on the California Data Exchange Center (CDEC) in the folder named "FNF Sum." (Currently these data are available at: <http://cdec.water.ca.gov/cgi-progs/stages/FNFSUM>). If DWR does not make the full natural flow for the full water year available until after October 14 but prior to or on October 31, from 3 days after the date the full natural flow is made available until February 14 of the following year, the water year type shall be based on the sum of DWR's monthly full natural flow for the full water year as made available. If DWR does not make available the final full natural flow by October 31, the water year type from November 1 through February 14 of the following year shall be based on DWR's May Bulletin 120.

Minimum Streamflows

Licensee shall meet the Minimum Streamflows shown in Table 2 of this measure.

Minimum Streamflows in this part of the measure shall mean the instantaneous flow except as otherwise provided below, and Licensee shall record instantaneous streamflow at all gages as required by USGS (Article 8 of the Commission's Form L-5, Standard Articles):

- Minimum Streamflows may be temporarily modified for short periods upon consultation with CDFG, State Water Board, FS, and BLM and approval by State Water Board and FS or BLM, as applicable, and notification to the Commission.
- Minimum Streamflows may be temporarily modified due to an emergency. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires;

vandalism; malfunction or failure of Project works; or other public safety incidents. If the Minimum Streamflows are so modified, Licensee shall notify the Commission, CDFG, State Water Board, FS, and BLM as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after such modification.

Except as otherwise provided, Licensee shall implement Minimum Streamflows shown in Table 2 of the measure within 90 days of license issuance unless a facility modification or construction is necessary. Where a facility must be modified or constructed to allow compliance with the required Minimum Streamflows, including flow measurement facilities, except as otherwise provided, Licensee shall submit applications for permits to modify or construct the facility as soon as reasonably practicable but no later than 2 years after license issuance and will complete the work as soon as reasonably practicable but no later than 2 years after receiving all required permits and approvals for the work. During the period before facility modifications or construction are completed, and starting within 90 days after license issuance, Licensee shall make a good faith effort to provide the specified Minimum Streamflows within the reasonable capabilities of the existing facilities.

Table 2. Minimum Streamflows¹ in cubic feet per second (cfs)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
MIDDLE YUBA RIVER - BELOW JACKSON MEADOWS DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11407815)						
October	11	11	13	15	20	35
November	11	11	13	15	20	35
December	11	11	13	15	20	35
January	11	11	13	15	20	35
February	11	11	13	15	25	40
March	11	11	16	25	35	60
April	30	30	30	50	60	100
May	60	60	75	90	110	120
June	21	21	30	50	75	100
July	11	11	16	25	35	60
August	11	11	13	15	25	40
September	11	11	13	15	25	40
MIDDLE YUBA RIVER - BELOW MILTON MAIN DIVERSION DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11408550)						
October	4	6	6	10	10	15
November	4	6	6	10	10	10 or 15 ¹
December	4	6	6	10	10	10 or 15 ¹
January	4	6	6	10	10	10 or 15 ¹
February	4	6	6	10	15	15
March	4	6	6	20	25	30
April	6	10	15	30	35	40
May ^{2, 3}	6	20	30	50	60	70
June	6	15	20	30	35	40
July	4	6	10	15	20	20
August	4	6	6	10	15	15
September	4	6	6	10	15	15
WILSON CREEK - BELOW WILSON CREEK DIVERSION DAM (COMPLIANCE POINT: ACT OF SETTING OUTLET WORKS)⁴						
October	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
November	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
December	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
January	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
February	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
March	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
April	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
May	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
June	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
July	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
August	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
September	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}	0.25 or NF ⁵ _{4, 5}
¹ Refer to Condition No. 29 regarding adjustment of Minimum Streamflows below Milton Diversion Dam in November, December and January of Wet WYs.						
² Refer to Condition No. 29 regarding Milton Diversion Dam spill cessation schedule.						
³ Refer to Condition No. 29 regarding Milton Diversion Dam recreation streamflow events.						
⁴ Refer to YB-AQR1, Part 5, regarding setting of the Wilson Creek Diversion Dam outlet works as the act of compliance.						
⁵ NF means natural flow. The Minimum Streamflow requirement below Wilson Creek Diversion Dam shall be 0.25 cfs or the natural flow at the dam, whichever is less.						

Table 2. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
JACKSON CREEK . BELOW JACKSON DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11414700)						
October	0.5	0.5	0.75	0.75	1	2
November	0.5	0.5	0.75	0.75	0.75	0.75
December	0.5	0.5	0.75	0.75	0.75	0.75
January	0.5	0.5	0.75	0.75	0.75	0.75
February	0.5	0.5	0.75	0.75	0.75	0.75
March	0.5	0.5	0.75	0.75	0.75	0.75
April	0.5	0.5	0.75	0.75	0.75	0.75
May	0.5	0.5	0.75	0.75	0.75	0.75
June	0.5	0.5	1	1	2	3
July	0.5	0.5	0.75	0.75	1	2
August	0.5	0.5	0.75	0.75	1	2
September	0.5	0.5	0.75	0.75	1	2
CANYON CREEK . BELOW FRENCH DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11414410)						
October	5	5	6	9	9	9
November	5	5	6	9	9	9
December	5	5	6	9	9	9
January	5	5	6	9	9	9
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September ⁶	5	5	6	9	14	18
CANYON CREEK . BELOW FAUCH ERIE DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11414450)						
October	5	5	6	9	9	9
November	5	5	6	9	9	9
December	5	5	6	9	9	9
January	5	5	6	9	9	9
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September	5	5	6	9	14	18

Table 2. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
CANYON CREEK - BELOW SAWMILL DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11414470)						
October	5	5	6	9	14	18
November	5	5	6	9	14	18
December	5	5	6	9	14	18
January	5	5	6	9	14	18
February	5	5	6	9	14	18
March	5	5	6	9	14	18
April	5	5	6	9	14	18
May	5	5	6	9	14	18
June	5	5	6	9	14	18
July	5	5	6	9	14	18
August	5	5	6	9	14	18
September	5	5	6	9	14	18
CANYON CREEK - BELOW BOWMAN DAM						
There is no Minimum Streamflow release requirement from Bowman Dam.						
CANYON CREEK - BELOW BOWMAN-SPAULDING DIVERSION DAM (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11416500)						
October	4	6	10	10	10	15
November	4	6	10	10	10	15
December	4	6	10	10	10	15
January	4	6	10	10	10	15 or 20 ⁶
February	4	6	10	15	20	25
March	4	6	10	15	20	25
April	6	13	15	30	35	40
May ^{7,8}	6	15	20	40	50	60
June	6	13	15	30	35	40
July	4	10	15	15	25	30
August	4	10	15	15	20	20
September	4	10	15	15	20	20
⁶ Refer to Condition No. 29 regarding adjustment of Minimum Streamflows requirement below the Bowman-Spaulding Diversion Dam in January of Wet WYs. ⁷ Refer to Condition No. 29 regarding Bowman Dam spill cessation schedule. ⁸ Refer to Condition No. 29 regarding Bowman-Spaulding Diversion Dam recreation streamflow event.						
TEXAS CREEK - BELOW TEXAS CREEK DIVERSION DAM⁹ (COMPLIANCE POINT: NEW STREAMFLOW GAGE TO BE CONSTRUCTED)						
October	0.6	1	1	2	3	3
November	0.6	1	1	2	3	3
December	0.6	1	1	2	3	3
January	0.6	1	1	2	3	3
February	0.6	1	1	2	3	3
March	0.6	1	1	2	3	3
April	0.6	1	1	2	3	3
May	0.6	1	1	2	3	3
June	0.6	1	1	2	3	3
July	0.6	1	1	2	3	3
August	0.6	1	1	2	3	3
September	0.6	1	1	2	3	3
⁹ Refer to Condition No. 29 regarding Minimum Streamflows during Bowman-Spaulding Conduit outages.						

Table 2. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
CLEAR CREEK - BELOW BOWMAN-SPAULDING DIVERSION CONDUIT¹⁰ (COMPLIANCE POINT: NEW STREAMFLOW GAGE TO BE CONSTRUCTED)						
October	1	1	1	1	2	2
November	1	1	1	1	2	2
December	1	1	1	1	2	2
January	1	1	1	1	2	2
February	1	1	1	1	2	2
March	1	1	1	1	2	2
April	1	1	1	2	3	3
May	1	1	1	2	4	6
June	1	1	1	2	3	3
July	1	1	1	1	2	2
August	1	1	1	1	2	2
September	1	1	1	1	2	2
10 Refer to Condition No. 29 regarding Minimum Streamflows during Bowman-SpaULDing Conduit outages.						
FALL CREEK - BELOW FALL CREEK DIVERSION DAM (COMPLIANCE POINT: NEW STREAMFLOW GAGE TO BE CONSTRUCTED)						
October	211	211	211	411	611	811
November	211	211	211	411	611	811
December	211	211	211	411	611	811
January	211	211	211	411	611	811
February	211	211	211	411	611	811
March	211	211	211	811	10 ¹¹	10 ¹¹
April	10 ¹¹	10 ¹¹	10 ¹¹	15 ¹¹	20 ¹¹	20 ¹¹
May	12.5 ¹¹	12.5 ¹¹	15 ¹¹	20 ¹¹	30 ¹¹	30 ¹¹
June	411	411	10 ¹¹	15 ¹¹	20 ¹¹	25 ¹¹
July	211	211	211	611	811	1011
August	211	211	211	611	611	811
September	211	211	211	611	611	811
11 The Minimum Streamflow shall be the flow specified in the table above or inflow, whichever is less.						
TRAP CREEK - BELOW BOWMAN-SPAULDING DIVERSION CONDUIT¹² (COMPLIANCE POINT: NEW STREAMFLOW GAGE TO BE CONSTRUCTED)						
October	0.25	0.25	0.5	0.5	1	1.5
November	0.25	0.25	0.5	0.5	1	1.5
December	0.25	0.25	0.5	0.5	1	1.5
January	0.25	0.25	0.5	0.5	1	1.5
February	0.25	0.25	0.5	0.5	1	1.5
March	0.25	0.25	0.5	1	1.5	1.5
April	0.25	0.75	0.75	2	3	3
May	0.25	0.75	0.75	3	3	3
June	0.25	0.75	0.75	2	3	3
July	0.25	0.25	0.5	0.5	1	1.5
August	0.25	0.25	0.5	0.5	1	1.5
September	0.25	0.25	0.5	0.5	1	1.5
12 Refer to Condition No. 29 regarding Minimum Streamflows during Bowman-SpaULDing Conduit outages.						

Table 2. (continued)

Month	Extreme Critically Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
RUCKER CREEK - BELOW BOWMAN-SPAULDING DIVERSION CONDUIT¹⁵ (COMPLIANCE POINT: NEW STREAMFLOW GAGE TO BE CONSTRUCTED)						
October	0.3	0.3	0.5	2	2	2
November	0.3	0.3	0.5	2	2	2
December	0.3	0.3	0.5	2	2	2
January	0.3	0.3	0.5	2	2	2
February	0.3	0.3	0.5	2	2	2
March	0.3	0.3	0.5	2	2	2
April	0.3	0.3	0.5	2	2	2
May	0.3	0.3	0.5	2	3	3
June	0.3	0.3	0.5	2	2	2
July	0.3	0.3	0.5	2	2	2
August	0.3	0.3	0.5	2	2	2
September	0.3	0.3	0.5	2	2	2
¹⁵ Refer to Condition No. 29 regarding Minimum Streamflows during Bowman-Spaulding Conduit outages.						

Canal Outages

This part of the measure pertains to outages of the Project’s Bowman-Spaulding Diversion Conduit and outages of the Drum-Spaulding Project’s Drum Canal that affect Minimum Streamflows described in this measure. For the purpose of this part of the measure, there are three types of canal outages: 1) annual planned outages; 2) non- routine planned outages; and 3) emergency outages. For the purpose of this part: an “annual planned outage” is defined as an outage that is typically taken around the same time each year for routine maintenance; a “non-routine planned outage” is defined as an outage for work that is high priority work (often major maintenance) and performed under planned conditions but is not performed during the annual planned outage period; and an “emergency outage” is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents.

Bowman-Spaulding Diversion Conduit

During the Annual Meeting (Condition No. 1) Licensee shall inform meeting participants about annual planned outages of the Bowman-Spaulding Conduit, including the anticipated time-frame that the annual planned outages will occur, and any non-routine planned outages that are already planned at the time of the Annual Meeting for the upcoming year. Annual planned outages of the Bowman-Spaulding Conduit are normally, but not always, taken for approximately a 2-week period sometime between mid-June and early July. Licensee shall in good faith provide FS, BLM, CDFG and State Water Board as much notice as is reasonably possible for any annual planned outages or non-routine planned outages of the conduit that were not noted in the Annual Meeting or that become anticipated to occur at a time that is different than reported in the Annual Meeting. For all annual planned outages and non-routine planned outages, Licensee shall comply with the Canal Fish Rescue Plan (Condition No. 30) as well as all applicable laws and

permitting requirements. Licensee shall provide FS, BLM, CDFG and State Water Board notice by electronic mail as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after an emergency outage occurs.

Table 3 of this measure provides the minimum streamflows required during the first 30 days of annual planned outages and non-routine planned outages of the Bowman- Spaulding Conduit. In an emergency outage of the Bowman-Spaulding Conduit, Licensee shall make a good faith effort to implement the minimum streamflows in Table 3 as soon as possible once the emergency occurs, and shall maintain the minimum streamflows for 30 days or until the emergency outage concludes. If an annual planned outage, non-routine planned outage, or emergency outage is anticipated to extend past 30 days, Licensee shall consult with FS, BLM, CDFG and State Water Board regarding minimum streamflows for the remainder of the outage after the first 30 days, and Licensee shall implement the collaboratively agreed upon minimum streamflows as soon as it is reasonably possible to do so for the remainder of the outage. Licensee shall also file any collaboratively agreed upon changes in minimum streamflows, as identified in Table 3, with the Commission.

Table 3. Minimum streamflow requirements during outages of the Bowman-Spaulding Diversion Conduit.

Stream - Facility	Minimum Streamflow during Annual Planned Outages, Non-Routine Planned Outages and Emergency Outages
Texas Creek - Below Texas Creek Diversion Dam	Flow in Texas Creek downstream of the Texas Creek Diversion Dam shall equal flow in Texas Creek upstream of the Texas Creek Diversion Dam. Licensee shall comply with this requirement by not diverting any water from Texas Creek into the Bowman-Spaulding Conduit during the outage (i.e., monitoring streamflow upstream in Texas Creek upstream of Texas Creek Diversion Dam during the outage shall not be required).
Clear Creek - Below Bowman- Spaulding Diversion Conduit	Flow in Clear Creek below the Bowman-Spaulding Conduit shall equal flow in Clear Creek upstream of the Bowman-Spaulding Conduit. Licensee shall comply with this requirement by not diverting any water from Clear Creek into the Bowman-Spaulding Conduit during the outage (i.e., monitoring of the streamflow in Clear Creek upstream of Bowman-Spaulding Conduit during the outage shall not be required).
Trap Creek - Below Bowman-Spaulding Diversion Conduit	Flow in Trap Creek below the Bowman-Spaulding Conduit shall equal flow in Trap Creek upstream of the Bowman-Spaulding Conduit. Licensee shall comply with this requirement by not diverting any water from Trap Creek into the Bowman-Spaulding Conduit during the outage (i.e., monitoring of the streamflow in Trap Creek upstream of Bowman-Spaulding Conduit during the outage shall not be required).
Rucker Creek - Below Bowman- Spaulding Diversion Conduit	Flow in Rucker Creek below the Bowman-Spaulding Conduit shall equal flow in Rucker Creek upstream of the Bowman-Spaulding Conduit. Licensee shall comply with this requirement by not diverting any water from Rucker Creek into the Bowman-Spaulding Conduit during the outage (i.e., monitoring of the streamflow in Rucker Creek upstream of Bowman-Spaulding Conduit during the outage shall not be required).

Overwintering Minimum Streamflow Adjustments

This part pertains to adjustments in the Minimum Streamflows described in this measure at Milton Diversion Dam in November, December and January of Wet Water Years and at Bowman-Spaulding Diversion Dam in January of Wet Water Years.

Middle Yuba River Below Milton Diversion Dam

In November, December, and January of Wet water years, the Minimum Streamflow in the Middle Yuba River downstream of Milton Diversion Dam shall be 15 cfs unless the precipitation

as measured at Licensee's weather station at Bowman Lake from the previous July 1 up to but not including the first day of the month is equal to or less than 75 percent of the annual average precipitation for the same period for the most recent 30 years. In that case, the Minimum Streamflow shall be 10 cfs.

Canyon Creek Below Bowman-Spaulding Diversion Dam

In January of Wet water years, the Minimum Streamflow in the Canyon Creek downstream of Bowman-Spaulding Diversion Dam shall be 20 cfs unless the precipitation as measured at Licensee's weather station at Bowman Lake from the previous July 1 up to but not including the first day of the month is equal to or less than 75 percent of the annual average precipitation for the same period for the most recent 30 years. In that case, the Minimum Streamflow shall be 15 cfs.

Wilson Creek Diversion Dam Flow Setting

This part pertains to compliance with the Minimum Streamflows described in this measure at Wilson Creek Diversion Dam.

Non-Winter Period

Licensee shall, within 90 days of license issuance and except for the "Winter Period" described below, check the outlet works at the Wilson Creek Diversion Dam once each week (i.e., from Sunday to Saturday) and, if needed, re-set the outlet works to make the Minimum Streamflow release for the Wilson Creek Diversion Dam set forth in Table 1 of this measure. During this time period, Licensee's compliance requirement is the act of setting the outlet works once each week consistent with the Minimum Streamflows for that month as set forth in Table 2 of this measure; that is, as long as Licensee has set the outlet works once each week, Licensee shall be deemed to be in compliance with the Wilson Creek Diversion Dam Minimum Streamflow requirements of this measure.

Winter Period

The Winter Period is defined as the period from no later than November 1 of each year until the following year when Licensee is able to safely access the Wilson Creek Diversion Dam. Within 90 days of license issuance, during each Winter Period Licensee shall by no later than November 1 set the outlet works at Wilson Creek Diversion Dam to make the Minimum Streamflow release for the Wilson Creek Diversion Dam set forth in Table 2 of this measure. Licensee shall not be required to re-set the outlet works until the end of the Winter Period, at which time Licensee shall set the outlet works for the flow release for that month as set forth in Table 1 of this measure. During the Winter Period, Licensee's license compliance requirement is the act of setting the outlet works no later than November 1; that is, as long as Licensee has set the outlet works, Licensee shall be deemed to be in compliance with the Wilson Creek Diversion Dam Minimum Streamflow requirements of this measure for the Winter Period.

Spill Cessation Measures

This part pertains to spill cessation and operations at Middle Yuba River below Milton Diversion Dam, Canyon Creek below Bowman-Spaulding Diversion Dam, and Bear River below Dutch Flat Afterbay Dam.

Licensee shall make a good faith effort to provide the target flows, measured as mean daily flow, within 10 percent of the target flows shown in Tables 4, 5, 6, and 7 of this measure. However, it is recognized that some conditions (e.g., storm conditions) may result in flows outside Licensee's ability to control. The target flows are targets only, and as long as Licensee shall make a good faith effort to meet the target flows, failure to meet the target flows shall not be considered a violation of this part of the measure. The requirements in this part are not subject to a ramping rate. Licensee shall make available to State Water Board, CDFG, FS, and BLM the streamflow records related to the spill cessation schedules upon request.

In years where a spill cessation schedule is implemented, for the period of time from the end of the spill cessation schedule in Tables 4, 5, 6, and 7 through September 30, with the exception of emergencies or when otherwise required by law or directed by regulatory agencies, Licensee shall make a good faith effort to not make releases from Milton Diversion Dam and Bowman-Spaulding Diversion Dam that result in short-term, high- flow fluctuations defined as a 100 percent or greater increase in a 12-hour period in the river downstream of the dam. In non-spill cessation years, Licensee shall make a good faith effort to not make releases from Milton Diversion Dam and Bowman-Spaulding Diversion Dam that result in short-term, high flow fluctuations as defined above in the river downstream of the dam from May 1 through September 30.

This measure does not apply in instances when Licensee is directed by the Commission or California Division of Safety of Dams to test (i.e., exercise) valves at Milton Diversion and Bowman-Spaulding Diversion dams (i.e., quickly open and close the valve). Licensee will make a good faith effort to schedule such inspections or outlet testing after September of each calendar year to avoid negative effects on aquatic species.

The dam spill cessation schedule requirements in this part are subject to temporary modification if required by equipment malfunction, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. If Licensee temporarily modifies the requirements of this condition, Licensee shall make all reasonable efforts to promptly resume performance of the requirements and shall notify BLM, FS, State Water Board, and CDFG within 48 hours of the modification.

Licensee shall commence the dam spill cessation schedules in this part within 90 days of license issuance unless a facility modification or construction is required. Where a facility must be

modified or constructed to allow compliance with the required spill cessation schedule, including flow measurement facilities, except as otherwise provided, Licensee shall submit applications for permits to modify or construct the facilities as soon as reasonably practicable but no later than 2 years after license issuance and will complete the work as soon as reasonably practicable but no later than 2 years after receiving all required permits and approvals for the work. During the period before facility modifications or construction are completed, and starting within 90 days after license issuance, Licensee shall make a good faith effort to provide the specified spill cessation schedules within the reasonable capabilities of the existing facilities.

Middle Yuba River Below Milton Diversion Dam

Licensee shall adhere to the Middle Yuba River below Milton Diversion Dam spill cessation schedule described in Table 4 of this measure after May 1 of each calendar year, or as soon as Licensee closes the Jackson Meadows Dam spill gates, whichever comes later. The first five days of this schedule (at 300 cfs) also provide flows for recreational whitewater boating. The spill cessation schedule is intended to be connected to the recreational whitewater boating days such that the spill cessation schedule is implemented immediately following the recreational whitewater boating flows.

Table 4. Spill cessation schedule in the Middle Yuba River downstream of Milton Diversion Dam after May 1. If the peak of the spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 50 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11408550
6 Days	300 cfs
3 Days	225 cfs
3 Days	150 cfs
3 Days	100 cfs
3 Days	80 cfs
2 Days	60 cfs
2 Days	50 cfs

Canyon Creek Below Bowman-Spaulding Diversion Dam

Licensee shall adhere to the Canyon Creek spill cessation schedule described in Table 5 of this measure after April 1 of each calendar year. This measure is intended to provide recreational whitewater boating flows during the spill cessation schedule, such that the spill cessation schedule is implemented immediately following whitewater boating flows.

Table 5. Spill cessation schedule in the Canyon Creek downstream of the Bowman- Spaulding Diversion Dam after April 1. If the peak of the spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 45 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11416500
1 day	275 cfs
1 day	230 cfs
1 day	200 cfs
2 days	160 cfs
2 days	130 cfs
2 days	100 cfs
2 days	85 cfs
3 days	70 cfs
3 days	55 cfs
4 days	45 cfs

Mitigation for Entrainment

Licensee shall, within 1 year of license issuance, develop a Fish Entrainment Protection Plan (Plan) for a fish screen for rainbow trout fry at or near the Milton-Bowman Diversion Dam on the Middle Yuba River in consultation with FS, CDFG, State Water Board, and file the plan, which has been approved by FS, with the Commission for approval. The Plan shall include evidence of consultation with USDI Fish and Wildlife Service and USDOC National Marine Fisheries Service. The Plan shall specify that Licensee shall construct and maintain a retractable cylindrical fish screen system to be installed in the Milton Diversion Impoundment in front of the existing Milton-Bowman Conduit Intake, unless a different system is otherwise agreed to during development of the Plan.

The Plan shall include but not be limited to the following:

- Local, state, and Federal permitting requirements.
- Fish screen design information.
- Schedule for implementing the construction elements of the Plan.
- Estimated costs
- Consultation with FS, CDFG, and State Water Board during the planning, permitting, and construction phases of the Plan.

Schedule

Licensee shall submit applications for permits and appropriate approvals to modify or construct the facilities described in the Plan within 1 year of the Commission's approval of the Plan, and will complete the work as soon as reasonably practicable but no later than 2 years after receiving all required permits and approvals for the work or as otherwise designated by the Commission.

Licensee shall provide annual Progress Reports (due December 31 of each year after the Commission's approval of the Plan), which detail the annual progress of implementing the Plan, and a Final Report (which would include design validation), upon completion of all fish screening facilities in the Plan, to FS, CDFG, and State Water Board and file these annual and final reports with the Commission.

Fish Screen Design

The design of the fish screening facilities in the Plan should allow for a design flow (Design Flow) of 170 cfs.

The fish screen should be designed using as guidelines the Environmental and Operational Objectives and Design Criteria identified below and as found in "CDFG Fish Screening Criteria" (CDFG 2000).

The fish screen design objectives are:

- Reduce entrainment of all life-stages of trout from the Middle Yuba River (at Milton-Bowman Diversion Conduit intake) into the Project's conduit system to less than significant levels.
- No reduction in reliability or hydraulic or electrical capacity of the Project's Powerhouses.
- No reduction in NID's existing State Water Board licensed and permitted water rights on the Middle Yuba River.
- Ensure consistency with providing the flow requirements in the Middle Yuba River, downstream of Milton Diversion Dam as described in Condition No. 29, Flow Measures.
- Provide for automated cleaning of the fish screens to avoid clogging.
- Provide for removal of fish screen(s) during winter icing conditions from October 31 through April 1. The screens may be removed as early as November 1 of each year until the following year when Licensee is able to safely access the Milton-Bowman Conduit intake area.
- In the event that either fish screen becomes clogged, provide for continued flow in the Project's conduit system to maintain the operational reliability of the Project's Powerhouses and avoid large, rapid fluctuations in stream flows below the Milton-Bowman Diversion Conduit intake.
- Allow flexibility to determine fish screen maintenance and outage schedule after obtaining operating experience.
- Allow removal or opening of fish screen during periods of high levels of potentially screen-clogging debris.
- Provide for opening of fish screen to assure continued flow in the Project's conduit system in the event the fish screen becomes clogged with debris.
- Design Flow Capacity: Fish screen flow capacity is based on screening a flow of 170 cfs.
- Approach Velocity (Fry Criteria - < 2.36 inches or < 60 millimeters (mm) in length): Reservoir: 0.33 fps (measured 3 inches in front of fish screen).
- Total Submerged Screen Area: Design Flow divided by Approach Velocity.
- Fish Screen Openings (Fry Criteria):
 - Screen material should provide a minimum of 27 percent open area.

- Perforated Plate: Screen openings should not exceed 3/32 inches (2.38 mm), measured in diameter.
- Woven Wire: Screen openings should not exceed 3/32 inches (2.38 mm), measured diagonally (e.g.: 6-14 mesh).
- Profile Bar: Screen openings should not exceed 0.0689 inches (1.75 mm) in width.

Ecological Group

Licensee shall, within 3 months of license issuance, in coordination with FS, BLM, CDFG, State Water Board, and other interested stakeholders, establish an Ecological Group for the purpose of assisting Licensee in the project-wide implementation of monitoring plans and review and evaluation of monitoring data.

Licensee shall provide to FS, BLM, CDFG, State Water Board, interested stakeholders, and the Commission by June 30 of each year an annual report of the activities of the Ecological Group.

Condition No. 30 – Canal Outages Fish Rescue Plan

A Canal Outages Fish Rescue Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 31 – Gaging Plan

A Gaging Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Condition No. 32 - Modifications of 4(e) Conditions in the Event of Anadromous Fish Re-introduction

FS reserves the right to modify these conditions to respond to any reintroduction of Chinook salmon or steelhead trout listed under the Endangered Species Act to stream reaches through NFS lands where the flow is controlled by this Commission licensed facility.

Condition No. 33–Aquatic Invasive Species Management

Licensee shall, within 1 year after license issuance, file with the Commission a plan approved by FS to address invasive species such as the New Zealand mudsnail (*Potamopyrgus antipodarum*), Quagga mussels (*Dreissena bugensis*), and zebra mussels (*Dreissena polymorpha*) if they are found during any monitoring.

Invasive algae (*Didymosphenia geminata*) was found throughout the Project area. If future studies document a safe method of reducing this invasive algae in rivers, Licensee may be asked to implement this task in Project-related locations.

Licensee shall implement the following AIS Best Management Practices (BMP) prevention within the FERC Project Boundary at Project reservoirs:

- Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:
 - Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site.
 - Removing visible plants, animals and mud from boat before leaving waterbody.
 - Cleaning and drying boats using California Department of Fish and Game (CDFG) accepted protocols for the prevention of all AIS before entering any waterbody area
 - Disposing of unwanted bait in trash, including earthworms.
 - Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody.
 - Preventing spread of invasive species like amphibian chytrid fungus.
- If any reservoir access sites become infested with AIS, Licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.
- In accordance with California Assembly Bill 2065 (2008) (enacted as FGC §2302), Project reservoirs will be assessed for their vulnerability to the introduction of nonnative dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.

Condition No. 34 – Terrestrial Protection Measures

Vegetation and Non-Native Invasive Plant Management Plan

A Vegetation and Integrated Pest Management Plan was provided in the Final License Application. Licensee will, within 1 year of license issuance, complete, in consultation with FS, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, and approved by FS, a single Vegetation and Non-Native Invasive Plant Management (NNIP) Management Plan (Plan) for all NFS lands and BLM administered lands potentially affected by the Project. Targeted NNIP will be those species defined by the California Department of Food and Agriculture (CDFA) code, the California Invasive Plant Council (Cal-IPC) rating system, or as FS or BLM species of concern.

The Plan will address special status species, terrestrial NNIP species, and revegetation within the Project boundary and adjacent to Project features directly affecting NFS and BLM lands including Project and project related roads, facilities, and distribution and transmission lines.

Minimum components of the Plan shall include, but may not be limited to:

- Special status species management: protection, monitoring, frequency of surveys, internal education, reporting, and adaptive management.
- Sensitive area protection, including guidelines for conducting activities that reduce the effects to sensitive resources.
- Non-native invasive plant (NNIP) species management: frequency of surveys, guidelines for prevention, treatment, internal education, monitoring, reporting, guidelines for conducting weed risk assessment for new project feature development, including an adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.
- Methods that ensure early detection and treatment of NNIP.
- Guidelines for treatment of NNIP populations on Federal lands within the FERC Project boundary. In areas where NNIP populations that are determined to be project-related extend outside the FERC Project boundary, treatments would extend up to 1% mile beyond the FERC Project boundary. If noxious weed populations extend more than 1% mile from the FERC Project Boundary, and are determined to be Project-related, Licensee will consult with FS or BLM to determine if the populations should be treated and, if so, the appropriate treatment methods. The same treatments are recommended on Licensee lands.
- Guidelines for conducting Licensee's inspections of equipment and vehicle for NNIPs.
- List of target NNIPs agreed to and approved by BLM and FS.
- Revegetation implementation and monitoring.
- Treatment protocols for vegetation management, hazardous fuels reduction, and hazard tree management for protection of Project facilities and Project-affected resources within the Project affected area.
- Pesticide/herbicide use approval and restrictions.
- Annual reporting guidelines for the Annual Meeting.

Licensee, in consultation with FS and BLM, will review, update, and/or revise the Plan if substantial changes in vegetation management occur. Changes may be implemented if monitoring feedback indicates that resource objectives are not being met.

Any updates to the Plan would be prepared in coordination and consultation with FS and BLM. A minimum of 60 days would be allowed for FS and BLM to comment and make recommendations before Licensee files the updated plan with the Commission. Any changes to the Plan shall be approved by FS and BLM. Licensee would include all relevant documentation of coordination/consultation with the updated Plan filed with the Commission.

Monitor Animal Losses in Project Canals

Beginning in the first full calendar year after license issuance, Licensee shall record animal losses in all Project canals. Specifically, Licensee's operators shall record in log books all dead animals observed on canal trash racks and otherwise in the canals using the Wildlife Mortality data sheets found in Appendix 4-2A of the Wildlife Movement Technical Memorandum (4-2) included in Appendix E12 of Licensee's application for new license. Licensee shall make a good faith effort to record the location of the dead animal (i.e. which Project canal, where in the

canal the dead animal was found, and the associated structure), species, date and time of the observation, suspected cause of death if it can be determined from visual observation only, photograph if available, estimated size, estimated age, and sex if known, and other pertinent information. The information will include the cumulative years and preceding year's mortality by canal segment, and a map showing segments (defined by location of trash racks). Licensee shall provide this information to CDFG, FS, and BLM at least 60 days prior to the annual consultation meeting described in Condition No. 1.

Licensee shall consult with FS, BLM, and CDFG and other interested parties during the annual consultation meeting, regarding the protection and utilization of the wildlife resources affected by the Project. If there is an increasing trend in animal mortalities in a canal, additional measures to address suspected Project-related causes for that canal may be developed by Licensee in consultation with CDFG, FS, and BLM. The Licensee shall prepare a report that includes the Licensee's recommendations for measures to address animal mortalities, and a schedule of implementation. Licensee shall provide the report to FS, BLM, and CDFG, as appropriate, for review and approval. The Licensee shall file the report, including evidence of consultation, with the Commission, and shall implement those resource management measures required by the Commission.

Replacement of Wildlife Escape and Wildlife Crossing Facilities

Prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along Project canals, Licensee shall consult with CDFG regarding specifications and design and with FS, as appropriate. Licensee shall file the design, including evidence of consultation, with the Commission within 60 days after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Licensee shall also assess existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order. Inspections shall occur at the same time other types of maintenance activities or canal assessments are being conducted.

Wildlife Crossings—Bowman-Spaulding Canal

Upon license issuance, Licensee shall maintain the following crossings (cross-referenced as GPSID in the metadata for Technical Memo 4-2 Wildlife Movement) in a functional condition for wildlife use: YDWMBS023/FS ID Point 143 within Section 30, T1 8N, R12E (Canal mile 5.8, UTM 10N 699846E, 4363 875N) and YDWMBS056/FS ID Point 147 located within Section 7, T17N, R12E (Canal mile 1.5 UTM 10N 700073E, 435931 2N). Licensee shall also maintain the following crossing, once it is constructed, which will be located in the vicinity of the following existing crossing: YDWMBS037/FS ID Point 144 within the NE 1/4 of Section 1, T17N, R1 1E (Canal mile 3.5, UTM 10N 699550E 4360760N). Licensee will not be required to remove or maintain the existing crossing at Point 144.

These three structures shall be identified as Licensee-maintained wildlife crossings and geo-referenced in a map and provided to FS, BLM, and CDFG. Licensee shall annually report the condition of each crossing, and as part of that report include maintenance and repair activities.

Bald Eagle Management Plan

A Bald Eagle Management Plan was provided in the Final License Application Amendment. Licensee will, in consultation with FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

Special Status Species

Before taking actions to construct new project features on NFS lands that may affect FS special status species or their critical habitat on NFS land, Licensee shall prepare and submit a biological evaluation (BE) for FS approval. The BE shall evaluate the potential impact of the action on the species or its habitat. FS may require mitigation measures for the protection of the affected species on NFS land.

The BE shall:

- Include procedures to minimize or avoid adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land

Licensee shall, beginning the first full calendar year after license issuance, in consultation with FS annually review the current lists of special status species (species that are Federally Endangered or Threatened, Proposed Threatened or Endangered, FS Sensitive, or Tahoe National Forest Watch Lists, State Threatened or Endangered, State Species of Special Concern, and CDFG Fully Protected) that might occur on National Forest System lands, as appropriate, in the Project area that may be directly affected by Project operations. When a species is added to one or more of the lists, FS, , in consultation with Licensee shall determine if the species or unsurveyed suitable habitat for the species is likely to occur on such NFS lands, as appropriate. For such newly added species, if FS determines that the species is likely to occur on such NFS lands, Licensee shall develop and implement a study plan in consultation with FS to reasonably assess the effects of the project on the species. Licensee shall prepare a report on the study including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to FS for review and approval. Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

If new occurrences of FS special status plant or wildlife species as defined above are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, Licensee shall immediately notify FS. If FS determines that the Project-

related activities are adversely affecting FS sensitive or watch list species, Licensee shall, in consultation with FS, develop and implement appropriate protection measures.

If new occurrences of state or federally listed or proposed threatened or endangered species are detected prior to or during ongoing construction, operation, or maintenance of the Project or during Project operations, Licensee shall immediately notify FS and the relevant Service Agency (United States Fish and Wildlife Service or National Marine Fisheries Service or CDFG) for consultation or conference in accordance with the Endangered Species Act. If state listed or fully protected species are affected, CDFG shall be notified.

Project Powerlines

Raptor-safe powerline design configurations described in Avian Protection on Powerline Interaction Committee's (APLIC) "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006), or the most current edition of this APLIC document, will be used for all new powerlines or when replacement of existing poles, phase conductors, and associated equipment is required.

If raptor monitoring performed as Condition No. 34 (Terrestrial Protection Measures, Raptor Collisions) indicates a substantial raptor-Project transmission line interaction issue, the poles where the interaction issue occurs on NFS Land will be replaced or retrofitted, as agreed to via consultation with FWS, FS, and CDFG.

Raptor Collisions

Licensee shall, beginning in the first full calendar year after license issuance, record annually all incidental observations by Licensee's operations staff of bird collisions/electrocutions at the Bowman-Spaulling Transmission Line. The reported incidental observations shall include the following information: 1) date of observation; 2) location of observation (i.e., nearest pole number); 3) species, if identifiable; 4) number of birds; 5) condition of bird(s) (i.e., dead or injured); 6) suspected cause of injury or death (i.e., electrocution or collision); and 7) was the bird banded and, if so, band number. Licensee shall provide this information for each year to FS, FWS, and CDFG at least 60 days prior to the Annual Meeting (Condition No. 1).

Bat Management

In the first full calendar year after license issuance, Licensee shall document all known bat roosts within Project buildings (e.g., powerhouses, storage buildings, valve houses), dams, or other structures that may be used as a roosting structure. The results of the inspection will be provided to CDFG and FS if the facility is located on NFS lands, at least 90 days prior to the Annual Consultation Meeting (described in Condition No. 1) that follows collection of the information. If bats or signs of roosting are present where staff have a routine presence (i.e., at least daily or weekly), Licensee will attempt, where feasible, and in the calendar year following the annual consultation meeting described above, to place humane exclusion devices to prevent occupation of the structure by bats. Human exclusion devices will be placed when bats are absent from the facility, generally between November 1 and February 28. Prior to installation of the

humane exclusion devices, Licensee shall perform an inspection of the facility to ensure that overwintering bats are not trapped. If overwintering bats are present during the inspection, installation of humane exclusion measures shall be delayed. Licensee shall notify FS of the overwintering bats. Licensee shall consult with the CDFG, FS, or BLM during the Annual Consultation Meeting described in Condition No. 1 to identify future dates that would be suitable for installation of humane exclusion devices. All exclusion devices will be inspected on an annual basis and the facility will be reevaluated for roosting bats every 3 years after the initial exclusion devices are installed to insure that no new roosts or entry points have been established.

Clear and Trap Creeks Channel Stabilization Plan

A stabilization plan for Clear and Trap Creeks was include in the FLA. Licensee shall, within 1 year of license issuance, coordinate with FS to complete this stabilization plan. Once it is approved by FS and the Commission, Licensee shall implement the Clear and Trap Creeks Channel Stabilization.

Condition No. 35 – Monitoring Program

Licensee shall implement a Monitoring Program after license issuance and through the term of the new license and any annual licenses, in coordination with FS, BLM, CDFG, and State Water Board. An overview with the primary elements of the monitoring program is provided below. These concepts have been presented to Licensee and initial discussions on details of the monitoring plan (e.g., numbers of sites per reach, years to monitor, field methods) have occurred. However, no specifics have been agreed to as of this filing. The Monitoring Program has been designed to monitor those items that are considered to be essential for determining if the resource objectives described in the Rationale Report are being met. Within the scope of the specified Monitoring Program, FS, BLM, CDFG, and State Water Board may select an equal number of alternative years to ensure that surveys occur during a range of water year types. Final study plans for each element of the Monitoring Program shall be approved by FS prior to implementation of the program. FS, CDFG, BLM, and State Water Board have the flexibility to alter the Monitoring Program methodologies and frequencies of data collection if it is determined that: (a) there is a more appropriate or preferable methodology or site to use than that described in the monitoring plan or (b) monitoring may be reduced or terminated because the relevant ecological resource objective has been met or no change in resource response is expected.

Licensee shall file with the Commission by June 30 of each year an Annual Report fully describing the monitoring efforts of the previous calendar year as well as a report documenting all deviations from the license conditions. FS, CDFG, BLM, and State Water Board shall have at least 30 days to review and comment on the draft report prior to filing with the Commission. Comments shall be addressed in the final report, or as appropriate, comments shall be included with the filing to Commission. Licensee shall provide copies of the annual report to FS, CDFG, BLM, and State Water Board. Every 5 years, Licensee shall provide a summary report of the monitoring results of the previous 5-year period, including any recommendations to address monitoring results, and provide to FS, CDFG, BLM, and State Water Board.

The following guidelines shall be used in implementing the monitoring program: (a) monitoring and studies shall be relevant to the Project, (b) monitoring and studies shall be conducted such that they provide useful information for management decisions or establishing compliance with license conditions, and (c) monitoring and studies shall be as cost-effective as possible. Funding for performing the monitoring, as well as specified contingency funding, shall be provided by Licensee.

For purposes of the Monitoring Program, each year is defined on a calendar year basis (i.e., January through December). This monitoring program covers monitoring to be conducted during all years until a new license is issued. Most monitoring described below is estimated to end after 30 years; however, if a new license is not issued within 30 years, FS, BLM, CDFG, and/or State Water Board reserve the right to extend the monitoring period as necessary.

The following is an overview of the aquatic monitoring program.

Large Stream and Riverine Aquatic Species

Streamflow conditions throughout the DS project will change as a result of the new license. Aquatic species may respond either positively or negatively to changes in timing, magnitude, and duration of streamflows. These streamflow changes will also lead to water temperature changes. Monitoring of aquatic species is proposed to allow assessment of their responses to streamflows and water temperatures and to take appropriate management actions as necessary.

Reaches

Large stream reaches include South Yuba River, Bear River, North Fork of the North Fork of the American, and Canyon Creek (below Towle Canal).

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on the distribution and abundance of special status, native, and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions. The following are focal species/species groups.

- rainbow trout (RBT) and other native fish species of interest
- foothill yellow-legged frogs (FYLF)
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)
- aquatic invasive species (e.g., *Didymosphenia geminata*)

Number of Sites and Frequency of Monitoring

Monitor one to four survey sites (depending on reach length and configuration) within each stream reach that each species or species group is currently known to occur (based on relicensing studies and other recent survey records). For FYLF and RBT, periodically expand the

survey area for the most upstream and/or most downstream sites in each reach to determine if the distributions of these species are shifting over the course of the license.

A combination of annual and periodic monitoring is proposed. Generally, a higher frequency of monitoring shall be done immediately following license implementation, lower frequency in the middle of the license period, and higher frequency again immediately prior to the filing of the NOI/PAD for the next relicensing. For FYLF, RBT, and BMI conduct annual surveys on a subset of sites for the first 10 years following implementation of new license conditions. After 10 years, Licensees will consult with resource agencies to determine if annual monitoring should continue.

Distribution and Population Metrics

Sampling effort should be sufficient to derive quantitative, repeatable, and reliable metrics of the lifestage periodicity/phenology, distribution, relative abundance, and condition (as appropriate) of each species/species group within each reach and throughout the project-affected area.

Example lifestage periodicity metrics:

- date range of FYLF breeding/egg mass deposition
- date range of RBT and other fish spawning and fry emergence

Example distribution metrics:

- # or proportion of sites occupied within stream reach
- # or proportion of sites occupied throughout all reaches

Example relative abundance metrics:

- # of FYLF egg masses per mile (or kilometer)
- # of FYLF by lifestage, stream distance or area surveyed # of WPT per survey time
- # of RBT by lifestage, per mile

Example condition metrics:

- RBT/other fish pounds per acre
- BMI diversity, biomass, sensitivity metrics

Special Purpose Monitoring

Conduct quantitative monitoring of fish populations in key large river reaches following extreme critical dry years.

Smaller Upper Elevation Streams - Aquatic Species

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on special status and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions.

Focal species:

- rainbow trout (RBT) and other fish species of interest
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)

Number of Sites and Frequency of Monitoring

Monitor small streams on a rotating basis every five to ten years.

Habitat and Environmental Conditions

Streamflow conditions throughout the DSYB projects will change as a result of the new license. These streamflow changes will also lead to water temperature changes. Monitoring of streamflow and water temperature is proposed to document compliance with minimum instream flow conditions and ramping/spill recession rates and to allow assessment of aquatic species responses to streamflows and water temperatures. Monitoring of geomorphology, riparian, stream substrate and woody material conditions are proposed to

Habitat and Environmental Conditions to Monitor

- streamflow/discharge (cfs) and stage monitoring
- water temperature
- channel morphology/riparian condition
- stream substrate and woody material conditions
- water quality and mercury bioaccumulation

Number of Sites and Frequency of Monitoring

- Streamflow/stage change and water temperature - Distribute data collection sites for streamflow and water temperature so that they will inform aquatic species monitoring. Collect 15 min and/or daily data each year. Provide real-time data for reaches/locations of interest (to be determined).
- Channel morphology/riparian, water quality/mercury bioaccumulation, stream substrate/woody material conditions – Conduct periodic monitoring of these habitat elements in reaches/locations of interest. For channel morphology and woody material, key reaches include: Bear River reach #2 (meadow and below Boardman Canal), Bear River below Rollins Reservoir and Bear River Diversion Dam, Middle Yuba below Milton, North Fork

of the North Fork American, Meadow Lake, Clear and Trap Creeks (related to channel stabilization plan).

Reporting

Summarize aquatic species monitoring data in annual monitoring reports that include, at a minimum, information on survey effort and timing, maps of species distributions, quantitative descriptions of species' distribution and relative abundance, and relationships (via graphing and other analyses) of species distribution/abundance to streamflow and water temperature conditions. Provide data to agencies and other interested parties electronically in spreadsheets (e.g., Excel) and spatial formats (e.g., GIS shapefiles). All electronic data should be linkable by a unique survey site and year identifier.

Summarize streamflow and water temperature data in annual reports and provide data to resource agencies in electronic format, preferably in HEC-DSSVue, or Excel. Summarize other environmental and habitat data in annual reports and provide data electronically to resource agencies.

After the first 5 years, the first 10 years, and at the end of each decade thereafter through the end of the license period, compile a summary report comparing survey information from the previous survey period(s).

Other resource areas that will be included in the overall monitoring plan are:

Recreation Monitoring

Monitoring associated with recreation are described in the Recreation measures.

Cultural Resource Monitoring

Monitoring associated with cultural resources will be described in the Historic Properties Management Plan.

Bear Management Monitoring

Monitoring associated with bear management (need for food locker) is described in the Recreation measures.

Wildlife Crossing Placement and Effectiveness

Ten years following license reissuance, and every ten years thereafter, Licensee shall arrange a meeting with FS, BLM, and CDFG, to review the location and design of Licensee-maintained crossings and natural landscape features that provide wildlife passage across Licensee's conduits, in context with changes in land use patterns, human development, and road improvements or decommissioning, that may affect wildlife use of crossings. As identified by

FS, BLM, and CDFG, Licensee will develop additional plans to address additional needs for crossings, exclosures, and escape structures, to be submitted to the Commission for approval.

Condition No. 36– Large Woody Debris

Within 1 year of license issuance, Licensee shall, in consultation with FS, BLM, CDFG, and State Water Board, prepare a Large Woody Debris (LWD) Management Plan approved by FS. The Plan will specify:

- Describe existing locations of LWD collection by Project facilities.
- Describe potential options for moving LWD below Project facilities and keeping the LWD within the river corridor.
- Identify suitable locations where LWD can be placed within the active channel to be mobilized by 2- to 5-year high flow events.

Upon Commission approval, Licensee shall implement the Plan.

Condition No. 37 - Recreation Survey, Monitoring, and Future Development Triggers

Survey and Monitoring

Licensee shall conduct recreation survey and monitoring as follows:

Licensee shall conduct recreation survey and monitoring as follows:

- Licensee shall conduct recreation monitoring on NFS land once every 6 years that will include evaluation of resource impacts from developed and dispersed use, including evidence of garbage and human waste left on site. FS shall be involved in the evaluation of resource impacts on NFS lands.
- Licensee shall conduct occupancy surveys of project facilities on NFS land on a 3- and/or 6-year cycle as described in the DSYB Recreation Trigger Plan (Attachment 1).
- Licensee shall conduct a Recreational User Survey (questionnaire) on NFS land once every 12 years starting from license issuance. The first visitor survey will be conducted in the first Form 80 reporting year/schedule following license issuance. Survey methods and questions shall be reviewed and approved by the FS in advance. The Recreation User Survey shall be focused to address the key issues at the time. Survey information shall be reviewed by the FS.
- At 6 and 12 years after license issuance, Licensee shall prepare the Recreation Monitoring and Survey Report and shall be provided to FS for review, comment, and approval prior to filing with the Commission. Both the 6 and 12 year Recreation Monitoring and Survey Reports shall incorporate: data from the information listed above; traffic counters (see Condition No. 44, Transportation System Plan regarding traffic counters installation, monitoring and reporting); other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, and Project Patrol reports that are available to Licensee when it prepares the Recreation Survey and Monitoring Reports occupancy rates; and other applicable information.

- Licensee shall file a Recreation Resources Report in compliance with the regulations at 18 CFR Section 8.11, or as amended.

The 6-Year Recreation and Survey Monitoring Reports shall address, at a minimum, the following factors:

- Occupancy and capacity information.
- Summarize monitoring results in relation to established triggers and address any changes in trends (including changes in peak season) since previous reports (or initially from relicensing studies).
- User and resource conflicts.
- Outstanding health and safety issues.
- Known bear encounters at sites without food lockers.
- A 6-year schedule for maintenance, rehabilitation, reconstruction and new construction.
- Proposed facility changes based on any mandated updated guidelines, such as ADA and FSORAG.
- New or modified management actions (increased patrols, additional sanitation facilities, closure orders, etc.) proposed to address concerns identified in report.
- Summary of the amount of garbage and evidence of human waste within 100 feet of dispersed campsites and concentrated use areas.

The 12-Year Recreation Survey and Monitoring Reports shall address, at a minimum, the following factors:

- All the items in the 6-Year Recreation Survey and Monitoring Report.
- Results of visitor surveys.
- Changes in use type, volume, group size, duration of stay, other use pattern and trends.
- Kinds and sizes of recreational vehicles (i.e. trailer, RV).
- Results of resource survey for riparian and lakeshore trampling, and barren core area at popular dispersed sites.
- User perceptions of crowding both at facilities and along lakeshore/lake surface.
- User perceptions on the need for garbage collection at developed sites.
- Percent of users seeing evidence of human waste (including toilet paper) and user perceptions on the need for toilet facilities at dispersed sites and concentrated use areas.
- Kinds, quality, quantity, and range of recreational opportunities visitors are engaging in.
- Preferences in recreation activities and amenities.
- Summarize the most current regional and statewide trends in recreation based on available surveys and reports.

Future Development Triggers

Future development triggers are addressed in Attachment 1.

Condition No. 38 - Licensee Contact

Licensee shall provide liaison contact with FS, whenever planning or construction of recreation facilities, other Project improvements, and routine and other maintenance activities are taking place within the NFS lands. Licensee agrees to cooperate with FS through this individual in contract review and work inspection.

Condition No. 39 - Review of Recreation Developments

Licensee shall schedule a meeting with FS at least every 6 years to review all Project- related recreation facilities described in Condition No. 41 and to agree upon necessary maintenance, rehabilitation, construction, and reconstruction work needed and its timing. Because the standard life of recreation facilities ranges from 20 to 30 years, it is anticipated that during the life of the license, facilities that are currently in good condition will need to be redesigned and reconstructed to standards applicable at that time. The criteria for project selection will depend on the amount and type of use, current recreation facility policy, condition of facilities, effects on surrounding areas, and other factors. Following the review, Licensee shall develop a 6-year schedule for maintenance, rehabilitation, and reconstruction, which shall be approved by FS prior to being filed with the Commission.

Condition No. 40 – Annual Recreation Coordination Meeting

Each year during the term of the licenses, Licensee will arrange to meet with interested resource agencies (FS and BLM at a minimum) for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure public safety, and protection and utilization of the recreation facilities listed in of this Plan. The date of the meeting will be mutually agreed to by Licensee and the resource agencies but in general will be held within the first 90 days of each calendar year. A detailed agenda will be provided to the resource agencies when the meeting date is proposed to assure that the appropriate parties are present.

The following will be discussed, at a minimum:

- Need for garbage collection based on the results of visitor surveys, evidence that wildlife is becoming habituated, and the status of garbage and litter left on site by users.
- Need for toilet facilities where dispersed camping is occurring will be discussed at least every 6 years (following submittal of Monitoring Report), and more frequently if warranted.
- Status of recreation projects from the previous year, including rehabilitation of existing recreation facilities, the establishment of new recreation facilities, and any other recreation measures or programs that were implemented.
- Any Licensee proposal for new or increases in recreation fees on NFS lands must be discussed and approved by FS.
- Recreational use data that is available.
- List of the recreation facilities scheduled for rehabilitation and any other Plan measures or programs to be implemented, including:
 - Logistical and coordination planning.

- Implementation schedule
- Coordination needs.
- Permitting requirements.
- Key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects.
- Potential adjustments in schedule.

The Annual Coordination Meeting is a minimum requirement; it is anticipated that meetings will occur throughout each year as needed to implement the Recreation Plans.

Any adjustments in specific actions or schedules shall be approved by FS and filed with the Commission.

Condition No. 41 – Recreation Plan

A Recreation Plan was provided in the Final License Application. Some progress has been made on updating this plan since the Final License Application was filed. Licensee will, in consultation and coordination with FS to finalize a Recreation Plan and submit for FS approval. Once the plan is complete, it will be included as part of this condition.

To assist Licensee in developing a final Recreation Plan for FS approval, the following elements should be addressed in the Recreation Plan:

General Measures For All Recreation Sites

Routine Recreation Facility Maintenance

On NFS lands, the standards for cleaning, operating and maintaining recreation sites shall be consistent with current FS standards and policies.

Licensee shall ensure that the following routine maintenance occurs at Project recreation facilities on NFS lands:

- At the beginning of each recreation season, and as needed throughout the season, replace, reset, improve, straighten, and reinstall barriers within and adjacent to all project recreation sites; along the roads surrounding Project lakes, and along Project roads and trails where there is uncontrolled vehicle use.
- If tables have sunk during the winter due to snow loads, they will be brought up to the level of the surrounding ground and placed on level ground.
- Maintain all recreation facilities in good working order. This includes keeping toilet doors and hardware in operating and locking conditions. If a structure is deemed to be unsafe, it will be closed until repairs are completed.
- Developed sites will be free of litter, human, and domestic animal waste.
- During the prime season all facilities will be inspected on a regular basis (as much as daily or more).

- Litter and trash collection shall be of a frequency that does not encourage animal encroachment, is not overflowing and does not emit offensive odors. The frequency will depend on the type of container. Two to four-yard dumpsters need to be dumped at least once a week. Receptacles shall be animal resistant.
- Ashes are to be removed from fire rings and grills, cooled and extinguished and disposed of at a county landfill. Ashes are not to be disposed of onsite and ashes which have been previously disposed of onsite (including those disposed of onsite by users) shall be properly disposed of as described above.
- Developed boat ramps will be inspected for obstacles and deterioration.
- Once a facility has been rehabilitated to provide for accessibility, clear floor space surrounding constructed features, graded tent pads and Outdoor Recreation Accessibility Routes shall be maintained.
- Rocks removed from unauthorized fire rings should be turned burned side down outside of the campsite.
- Remove trash from toilet vaults when pumped.
- Remove trash from (road accessed) dispersed sites on a weekly basis between Memorial Day and Labor Day and twice monthly after Labor Day, until the facilities are closed for the winter. Remove trash from non-road accessed dispersed sites on a monthly basis between Memorial Day and Labor Day. Throughout the season, dismantle user created fire rings at lakes where camping is limited to designated sites only.
- Annually maintain site identification markers.

Drinking Water Standards for Recreation Sites that Provide Potable Water

Licensee shall ensure that recreation facilities that provide drinking water as well as new drinking water systems be managed as public drinking water systems (i.e. serve at least 15 service connections or 25 persons) under the federal Safe Drinking Water Act (SDWA) that was signed into law in 1974, and reauthorized in 1996 (or its replacement).

Vegetation Management in Recreation Sites

Licensee shall ensure that vegetation management, including but not limited to hazard tree and branch removal, vegetative screening, brushing, or pruning occurs at Project recreation facilities located on NFS lands. Licensee shall ensure that the following vegetation management elements occur:

- Hazardous trees or branches must be actively searched for and identified by qualified personnel (Land Management Planners, Foresters, Arborists) and removed in a timely manner. In early spring, a qualified person will survey developed recreational facility boundaries, parking lots and immediate access routes to recreation areas for hazard trees and hazardous branches. Identified trees are to be removed before the campgrounds are occupied by the public. If time allows, hazard tree clearing should be conducted in the late fall to remove the bulk of the trees ahead of the spring camping rush.
- For visual mitigation stumps remaining within developed campgrounds shall be no greater than 6 inches in height and preferably cut to ground flush to ground level.

- The slash from hazard tree/branch removal will be chipped or lopped and scattered (<18 inches in depth) at least 100 feet away from the recreation site boundary, and the trunk is either hauled away or cut into rounds no larger than 8 inches in diameter and 18 inches long for use by campers. Larger rounds will be removed from the recreation site or split into firewood size pieces and either stacked for use by campers, or bundled and sold to the campers.
- All freshly-cut conifer stumps within 2 hours after the tree is felled will be treated to prevent the spread of Annosus Root Disease. In no case shall stumps be left untreated at the end of the shift during which the tree was felled. FS approved stump treatment compound, when applied properly, should cover the entire stump surface with a thin layer and also other areas of the stump where the bark has been knocked off. Where a liquid stump treatment compound is used, the spraying of a thin film of the solution on the stumps surface is all that is needed. A dye, mixed in with this solution, is useful to show where stumps have been sprayed. Handling directions are provided on the labels of stump treatment product containers and should always be followed. Only pesticides registered in California can be used on NFS lands, and all FS policies and practices and California regulations relating to pesticide use must be followed. To avoid adverse effects to aquatic species and their habitats, Licensee will work with FS regarding pesticide use within recreational facilities that are within 500 feet of aquatic habitats.
- Licensee will maintain 5-foot radius clearance to bare mineral soil around all fire rings, and remove overhanging branches to a height of 10 feet. This includes fire rings within developed recreation sites and those located at dispersed sites. Because wildfires do not stop at land ownership boundaries, fire ring clearance standards need to apply to NFS, BLM, and Licensee lands.
- During new construction and reconstruction work, Licensee will use care to protect existing vegetation through the incorporation of the Construction Specification Institute (CSI) Section 02233 – Tree Protection, or other specifications that provide equal or better vegetation protection.
- Within and adjacent to all developed project recreation sites, provide for periodic silvicultural evaluation, stand improvement, view enhancement and vegetative planting work to identify unseen hazard trees, assure stand health, provide for screening within and between sites and enhance views or project lakes and other scenic features.

Food Lockers

- Within 2 years of license issuance, at sites with garbage service, all garbage containers will be animal resistant. Adjacent to the garbage containers, provide a clear, level, compacted ground space (aka clear floor space) meeting dimensions and cross slopes specified in the FSORAG requirements for “Trash, Recycling and other Essential Containers” (or current requirements).
- Within 5 years of license issuance (unless specified sooner at a specific site), replace all existing plastic food storage lockers with metal animal proof food storage lockers large enough (30-cubic feet) to hold a large cooler and install new metal animal proof food storage lockers at all remaining (Development Scale 2 and above) campgrounds (except Milton) where food storage lockers are missing (regardless of land ownership). Adjacent to the locker, provide a clear, level, compacted ground space meeting dimensions and cross

slopes specified in the FSORAG requirements for “Trash, Recycling and other Essential Containers” (or current requirements). These lockers need not be installed in remote, primitive campsites (which consist of a fire ring and site marker only).

Fire Rings

Every 2 years inspect all fire rings, maintain in good condition or replace. Good condition includes a level grill with a usable grate.

Recreation Facility Ownership

Unless otherwise agreed to, all improvements on NFS lands shall become the property of FS upon completion, final inspection, and acceptance by the agency.

Facility Plans

Within 5 years of license issuance, provide as-builts drawing of all project facilities. Asbuilts should reflect current dimensions and layouts, including underground utilities. As alteration, improvement, new construction or expansion occurs, provide updated asbuilts. As-built drawings should be provided in hard copy and an electronic format (“.dwg” format).

Public Information and Education

- Within 2 years of license issuance, provide information about how the public can help prevent the spread of amphibian chytrid fungus and other water-borne pathogens at all information kiosks and boat launches (both formal and informal) in the Project.
- Within 1 year of license issuance, provide signs addressing applicable lake surface regulations at all recreation sites that are located on project lakes and in compliance with land management agency management plans.
- Within 2 years of license issuance, in coordination with FS develop an information strategy which includes maps, information, brochures, signs, websites etc. to provide information to enhance the project recreation opportunities and protect and interpret the area natural and cultural resources. An implementation schedule shall be part of this strategy, with all actions implemented within 5 years of the license issuance. Include educational material aimed at preventing animal habituation; leave no trace camping and other resource protection messages, appropriate to the individual facility. At each Project recreation site, provide an information display with a map and information illustrating the recreational opportunities in the area as well as emergency contact information, proper food storage and other salient information. For facilities on NFS lands identify that the facility is on the Tahoe National Forest. Develop all displays in consultation with the applicable resource agency. Review and, as needed, update recreation information signs on a 6-year cycle. Replace signs as needed.

Minimum Features Required at Newly Constructed and Reconstructed Campground Facilities

All newly constructed and reconstructed campgrounds on NFS lands shall contain a minimum of the following constructed features unless specifically excluded in this Plan (or subsequently agreed to the contrary):

- Roads and spurs with barriers to prevent off road travel.
- Tables.
- Fire rings.
- Animal resistant food lockers.
- Bulletin boards.
- Entrance station and sign.
- Toilets.
- Site markers.
- Levelled tent pads.
- Routes between site features, which would include Outdoor Recreation Accessibility Routes (ORARs—at Development Scale 3 and above).
- To meet the intent of FS accessibility direction, all new or rehabilitated/reconstructed Project recreational areas and facilities on NFS lands will meet FS Outdoor Recreation Accessibility Guidelines (FSORAG 2006) and FS Trail Accessibility Guidelines (FSTAG 2006), or their replacement, current at the time of design.

Heavy Maintenance

Licensee will be responsible for the cost of the necessary maintenance, rehabilitation, and reconstruction, including the costs of design and administration, as determined through the Review of Recreation Developments (as described in Condition No. 39) for the Project recreation facilities. Heavy maintenance and rehabilitation are defined as work that is necessary to keep existing facilities in serviceable condition to meet FS standards and includes components of recreation facilities such as water systems, traffic control barriers, roads, spurs, and associated drainage structures, grills and fire rings, picnic tables, toilets, and signboards. Licensee shall use FS standards for the frequency of heavy maintenance as a guideline, but not a prescription, for Licensee's performance of its heavy maintenance responsibilities. As determined through the Review of Recreation Developments (as described in Condition No. 39), heavy maintenance projects may be deferred that would otherwise be timely under FS frequency standards, if FS determines that actual conditions indicate that the project is not yet necessary.

General Reconstruction

Prior to reconstruction of a recreation facility, Licensee shall meet with FS to review the design of the facility in light of changes in use and design standards since the facility was constructed. Modifications will be made to the facility design to address the functionality of the facility and compliance of the facility with current design standards. This will include, but not necessarily limited to: road widths and geometry and spur width and length (in light of the current vehicle use

of the facility); providing additional campsites when warranted by demand; and compliance with current federal and agency accessibility standards: NFS lands - Forest Service Outdoor Recreation Accessibility Guide (FSORAG), Architectural Barrier Act (ABA) Accessibility Standards (ABAAS) and agency facility design standards, or other applicable standards at the time of design, and; Licensee lands - Americans with Disabilities Act (ADA 1990). Modification of the design may involve land beyond the existing footprint.

Additional features (such as gates) may be added as part of the design modification.

Reconstruction will address site grading and other site modifications including, but not limited to:

- Reconstruction, or replacement of constructed features, including - toilets, gates, table, fire rings, septic systems, water system features, barriers, retaining walls, unit markers, bulletin boards, signs, entrance and fee stations, animal resistant food lockers etc.
- Accessibility - Evaluate opportunity to provide accessibility at all campsites and (to the degree topographically feasible) implement these opportunities. At Development Scale 3 or higher recreation facilities provide Outdoor Recreation Access Routes between constructed features, campsites, toilets and spurs.
- Regrading and graveling non-paved roads and spurs.
- Resurfacing paved road, including providing asphalt treatment of roads and spurs and sufficient subgrade and (where appropriate) providing turn outs at entrance stations, toilets, trash bid pads etc. Providing asphalt treatment of spurs when the circulation road is paved.
- Address opportunities to lengthen and widen spurs as needed.
- Replacement of wood barriers with rock barriers and of sufficient quantity to prevent off road travel. Install additional barriers as needed.
- Remove protrusions and provide a graded living space including tent pads and clear floor space around tables, food storage lockers and grills.
- Installation of gates.
- Upgrade of host sites with a minimum of septic and water to improve public service and campground management by allowing the manager to attract high quality hosts.
- Providing enhancements such as extra parking when there is a demand.
- Installing signing that meet FS standards and address recreation area opportunities (including trails), maps of facilities, resource protection information (appropriate for the area), emergency contacts, safety, and regulations (including water surface regulations).

All work should be completed within the year specified below.

Specific Facilities - Jackson Meadows Reservoir Area

Continue to limit camping to developed sites only around Jackson Meadows Reservoir.

Jackson Meadows Development Plan

Within 1 year of license issuance (if not completed prior to relicensing, since it is a requirement of the current Exhibit R) (the measures on NFS lands are required under Section 4(e) and the measures on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- In consultation with FS, prepare a development plan for facility expansion. Since there is a limited amount of developable land in the area, part of the intent of developing this plan is to assure the optimum use of this land to meet future project induced recreation. This plan should attempt to provide the following capacity (based on suitable topography):
 - Additional 100 PAOT group sites (preferably accessible along paved road) in 25 PAOT units.
 - Additional 57 Development Scale 4, family campsites (preferably accessible along a paved road).
 - Shower facilities, one on each side of the lake.
 - An RV dump station, with a leach field, on the east side of the lake.
 - Replacement of at least six RV overflow sites with potable water that are accessible by paved road to replace the sites at Pass Creek Overflow.
 - Plans (throughout the term of the license) to acquire access to sufficient lands to meet the projected demand. This should include acquiring, by any means necessary, but not including by condemnation, fee title land or an easement to provide public access to the Jackson Point peninsula in order to allow additional recreational development of that land, if Licensee and public lands with legal access are insufficient to meet the development needs. Acquire other private land or rights to use private land, if needed, to meet the development needs outline above.
- The Recreation Development Plan shall be approved by the applicable resource agencies, including FS at a minimum. Licensee shall be responsible for the environmental documentation, development of sites, and/or implementation of measures identified in this plan after approval of the plan.
- Continue to monitor visitor feedback on crowding of lakeshore and water surface throughout the new license and make appropriate adjustments to proposals for construction of new facilities based on the results of this monitoring.

Sanitary Surveys

Within 2 years of license issuance (the measures on NFS lands are required under Section 4(e) and the measures on Licensee lands are recommended under Section 10(a) of the Federal Power Act), conduct sanitary surveys of all septic tanks and disposal fields. Locating, potholing, and excavating will be required. Depending on the results of this investigation, additional work will be specified which may include improvements, or complete redesign and installation of new systems at some point in the license. When this survey is completed on a septic system, inspection tubes shall be installed in the disposal field, risers shall be installed on the septic tanks and paddle markers shall be installed identifying the underground utility locations.

Group Campgrounds Construction

- Within 4 years of license issuance, construct group campground facilities with potable water to accommodate at least 50 PAOT.
- If agreement cannot be reached on occupancy triggers, construct the remaining group campground 50 PAOT called for in the Jackson Meadow development plan within 20 years of license issuance. If agreement is reached on occupancy triggers, construct additional sites when triggers are reached.

Family Campgrounds Construction

- Within 8 years of license issuance, construct a minimum of 20 additional family campsites with potable water. This may include expansion of existing campgrounds. Include a host site in each new family campground. The host site should include water and septic.
- As existing facilities are reconstructed, implement opportunities to construct additional campsites as part of the reconstruction (such as providing additional tent and walk-in campsites at East Meadow).
- If agreement cannot be reached on occupancy triggers, construct the remaining family campsites called for in the Jackson Meadow Development Plan within 20 years of license issuance. If agreement is reached on occupancy triggers, construct additional sites when triggers are reached.

Jackson Meadows Existing Facilities

All facilities in the Jackson Meadows complex, except Jackson Point Boat-in Campground, will be managed as Development Scale 4.

Provide road surface treatments consistent with the Pavement Management System on all recreation facility roads and upon reconstruction provide sufficient road subgrade.

Upon reconstruction of family campgrounds, provide additional vehicle and trailer parking where topography allows.

Aspen Group Campground

Recommendations on Licensee lands:

Within 2 years of license issuance:

- Improve barriers to prevent off road use
- Mark accessible parking.

Within 10 years of license issuance, reconstruct campground, including:

- Reconstruct and widen road.
- Expand parking areas, especially in Spring Unit.

Aspen Picnic Area

Within 5 years of license:

- Construct a non-motorized, trail (Trail Class 3) from Aspen Group Camp to Aspen Picnic Area parking area.
- Replace 4-unit vault toilet with a 2-unit vault toilet.
- Designate accessible parking.

- Meet Forest Service Outdoor Accessibility Guidelines at a minimum of two sites. Provide accessible tables and pedestal grills at these sites. At a minimum, provide a clear, level compacted ground surface with flattened area picnic area around tables, hydrants, and grills to meet Forest Service Outdoor Accessibility Guidelines. Provide Outdoor Recreation Access Route between accessible sites, constructed features, toilet, and parking area.

Within 10 years of license issuance, reconstruct picnic area, including:

- Reconstruct road.
- Review appropriate number of sites based demand. Reduce number of sites appropriately.

Pass Creek Campground

Within 8 years of license issuance:

- Replace two flush toilet buildings with fully accessible flush toilets.
- Upgrade the host site to include septic/holding tank or leach system.

Within 15 years of license issuance, reconstruct campground, including:

- Provide additional vehicle and trailer parking.
- Lengthen and widen spurs. At a minimum provide five spurs that are 16 feet and eleven spurs that are 13 feet wide).
- Replace or rehabilitate vault toilets, as needed.

Pass Creek Boat Ramp

Within 1 year of license issuance:

- Provide asphalt treatment on the high water launch (referred to as ramp A on Licensee's condition surveys).
- Replace wooden barriers with boulders.
- Provide more prominent signing regarding submerged stumps and rocks.

Within 5 years of license issuance:

- Provide 21 additional parking spaces primarily for vehicles with trailers by converting the Pass Creek Overflow sites to boat ramp parking. Construct additional parking spaces by expanding the pavement (up to the total of 21 vehicle/ trailer spaces) as topography allows. At a minimum provide 12 additional spaces for vehicles with trailer and 9 additional spaces for single vehicles.
- Construct a non-motorized, accessible trail from Pass Creek Boat Launch to Aspen Picnic Area beach area. Provide additional accessible parking spaces at boat launch for trail parking.

- Provide low-water boat launching access below the constructed ramp to provide for fishing access until September 30 in Critically Dry water year types. Maintain this low water access whenever the lake drops below the constructed ramp prior to September 30. (This could include work such as clearing, grading, and installing gravel, but is not intended to be a major capital improvement.)
- Develop at least six RV overflow paved parking sites, potable water, table, fire rings, and access to a toilet similar to and to replace the overflow parking at Pass Creek Overflow. These sites should be located in an area that will not require the users to drive on an unpaved road to access the sites.

Within 15 years of license issuance, reconstruct boat ramp to California Boating and Waterways standards; replace toilet and other facilities as needed.

Pass Creek Overflow (aka Henness Pass Campground)

Within 5 years of license issuance:

- Construct new 1-unit vault accessible toilet.
- Provide picnic tables (replacing the remaining wood tables) and fire rings around the edge of the parking area so that overflow camping can be provided at this site when the lake levels drop. The number of overflow sites will be determined during the site design.
- Provide removable unit markers. Manage the site for boat ramp parking until lower parking area is useable, and this area is not needed for boat launch parking. Then install removable site markers at each overflow campsite and allow overflow camping.

East Meadows Campground

Within 1 year of license issuance, replace two entrance signs (one in campground and one on the 07 road).

Within 5 years of license issuance:

- Expand existing parking, and provide additional trailer and vehicle parking. At a minimum:
 - Expand the existing parking area to 15-25 feet by 60 feet and provide gravel surfacing
 - Install a second parking area near site #34. This parking area should be at least 30 feet by 60 feet with a gravel surface.
- Construct/maintain a non-motorized trail (~0.1 mi.) from the campground to the river. The trail should be designed for pedestrian with a native surface.
- Convert the two-unit flush toilet building in the lower loop to a two-unit vault toilet.
- Upgrade the host site to include septic or holding tank.

Within 15 years of license issuance, reconstruct campground including:

- Lengthen/widen spurs (at a minimum, expand seven spurs to 16 feet wide and nineteen spurs to 13 feet wide).

- Rehabilitate/reconstruct road.

Firtop Campground

Within 10 years of license issuance, reconstruct the campground including:

- Rehabilitate/reconstruct road.
- Lengthen/widen spurs and provide pull-through spurs, where feasible.
- Construct and maintain non-motorized pedestrian native surface trails between Woodcamp Interpretative Trail and Woodcamp, Firtop, and Findley Campgrounds. Install and maintain directional signing.
- Add a single unit vault toilet.

Woodcamp Campground

Within 3 years of license issuance (the measures on NFS lands are required under Section 4(e) and the measures on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- Replace one wooden 2-unit vault toilet with new double unit accessible vault toilet and provide ORAR to the toilet entrance.
- Replace entrance sign.

Within 10 years of license issuance, reconstruct campground including:

- Lengthen/widen spurs and provide pull-through spurs, where topography allows.
- Provide additional trailer and vehicle parking,
- Reconstruct road.
- Upgrade the host site to include septic/holding tank.

Woodcamp Picnic Area

Within 5 years of license issuance reconstruct picnic area including:

- Replace six picnic tables with accessible tables.
- Provide six accessible pedestal grills.
- Replace one 4-unit toilet (by the beach) with 2-unit vault.
- Develop vehicle access via one-way road to lower toilet with parking for up to four vehicles and signing. Two of the spaces will be signed as accessible parking spaces and up to two spaces will be designated for loading/unloading. The purpose of this road would be to facilitate the use of the beach.
- Construct Outdoor Recreation Access Routes from the parking area to toilet and picnic sites; and from lower accessible parking spaces to beach area and toilet.
- Reconstruct road.

Woodcamp Boat Ramp

Within 5 years of license issuance, reconstruct the boat ramp to meet California Department of Boating and Waterways and current accessibility standards to provide a 2-lane ramp with an accessible courtesy dock and sidewalk. To the degree topographically feasible, the ramp should provide for launching in Dry water years until September 30. The following includes, but is not necessarily limited to, additional elements of this reconstruction:

- Pave and stripe parking area; provide and designate accessible parking.
- Replace one 2-unit toilet with an accessible 2-unit vault toilet.
- Provide Outdoor Recreation Access Routes between parking and toilets.
- Maintain prominent signing regarding submerged stumps and rocks.
- Provide informational sign that meets FS standards.
- Construct trail from parking lot to the Woodcamp beach and install signing.

Silvertip Group Campground

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Replace unit marker.
- Replace two information signs.
- Provide accessible routes in both group sites (between cooking and eating areas, restrooms, tent camping areas, parking and group fire ring areas). Address opportunities to provide an accessible route to Lakeside unit and/or lakeshore from the parking area, if topography allows. Aim to provide a 36-inch-wide trail (with passing lanes and resting areas) with no more than 30 percent of the total trail length exceeding 8.33 percent
- Regrade tent pad areas. Provide for a minimum of 1 accessible tent pad in each group area.
- Regrade group cooking and eating areas.
- Reconstruct interior campground roads and parking area; designate/sign one van accessible parking space per unit. Provide 10 additional paved vehicle parking. Replace remaining wooden tables, including serving tables.

Within 20 years, reconstruct campground.

Findley Campground

Within 3 years of license issuance:

- Repair road damage sufficiently to last until reconstruction.
- Replace water source.

Within 10 years of license issuance, reconstruct campground including:

- Replace retaining walls.
- To the degree feasible, provide additional trailer and vehicle parking.
- Reconstruct and widen circulation road.
- Replace flush toilet with accessible toilet and construct paved pathway to entrance.

Jackson Point Boat-in Campground

Within 2 years of license issuance, reconstruct the campground to meet the current FS design standards for a Development Scale 3 campground, including:

- Replace 2 toilets with toilet facilities that are acceptable to FS and Sierra County Sanitarian. Licensee shall be responsible for the logistics associated with waste disposal.
- Relocate sites that are currently not being used. Remove unused facilities
- Install metal animal resistant food storage lockers.
- Address opportunities to provide for accessibility.

Jackson Vista Point

Within 5 years of license issuance, gravel the parking area.

Within 15 years of license issuance, rehabilitate or replace restroom building.

Jackson Meadows Administrative Site

- Provide landlord type maintenance of all facilities except the barracks. Demolish barracks and re-vegetate site.
- Landlord type maintenance includes maintenance, reconditioning, renovation or improvement that arrests deterioration improves and upgrades facilities and appreciably prolongs the life of the property. Examples include, but are not limited to, installing a new roof, new floor, new siding or new water barrier envelope; replacing furnace, water heater, pipes, pumps, interior drywall or wallboard; repairing electrical service; paving interior roads, and performing exterior painting and refinishing. (Exterior painting that repairs unsightly visual marks caused by everyday use is not considered landlord maintenance.) If there is temporarily no tenant deferred tenant maintenance will default to landlord maintenance until the facility is once again needed to support the operation of the recreation facilities. Continue to provide tenant-type maintenance of these facilities.
- If Licensee does not desire to utilize the administrative facility to support the operations, FS may require Licensee to demolish and remove some or all of the facilities and re-vegetate the site.

Jackson Sanitary Dump Station Enhancement

If all efforts to improve, modify, or manage the existing dump station fail, construct a dump station with a leach field, preferably in the vicinity of the eastern portion of the reservoir. Provide potable water with RV filling station. The new location could be on National Forest System land or Licensee land. If feasible, design facility with sufficient space so that if a decontamination-station

(for aquatic invasive species) is needed in the future, it can be co-located with this facility (unless this potential need for a decontamination station is addressed elsewhere).

Recommendations on Licensee lands:

- Within 2 years of license issuance, retrofit riser to prevent the tank from filling with snowmelt.
- Consider alternative uses for the site in the Recreation Development Plan, to be constructed as needed when the dump station is decommissioned.

At the point when any major component of this facility is in need of rehabilitation, decommission the dump station. The determination of the need for rehabilitation would include at least any of the following items:

- Water system not sufficient for demand.
- The holding tank is leaking as evidenced through such things as the lack of liquids (indicating that the fluids are leaking out) or being full in the spring after being drawn down over the winter (indicating that liquids are leaking in from the nearby wetland)
- Subgrade failure of the road.

Woodcamp Interpretive Trail

Annually provide trail maintenance on Woodcamp Interpretive Trail, and the connector trails between this trail and the campgrounds. Work shall be performed in compliance with Standard Specifications for Construction and Maintenance of Trails EM-7720-103 (or equivalent at the time of maintenance). Annual maintenance will include logging out trails, imminent danger tree removal, performing spring and fall drainage maintenance (including installing new drainage structures as needed), bridge maintenance and loose rock removal. On a five year cycle, trail maintenance will also include brush cutting; embedded rock and root removal; slough and berm removal; and (if appropriate) turnpike, retaining wall and switchback maintenance. Reconstruction needs (including bridge reconstruction) will be addressed on an “as needed” basis.

Within 5 years:

- Install a more prominent trailhead sign at start of Woodcamp Interpretive Trail.
- Improve parking area for Woodcamp Interpretive Trail.
- In consultation with FS, develop, install, and maintain interpretive signs on Woodcamp Interpretive Trail to replace the existing brochures.

Additional Trail Construction

- Within 5 years of license issuance, install and maintain trailhead and directional signing on all trails in the Jackson Meadows area. Include the location of all trails in any maps or information about opportunities in the area.

- Within 5 years of license issuance, construct and maintain a (Trail Class 3) non- motorized trail from the Vista Point and Aspen Group Campground to a lake overlook point above the quarry.
- Within 15 years of license issuance, construct and maintain a new (Trail Class 3) non- motorized trail from the vicinity of Woodcamp Complex to English Dam with interpretation of English Dam site. Construct as much of this trail as possible near the shoreline, although topography will dictate the location. If feasible, connect this trail to the Woodcamp Interpretive Trail. If it is not feasible to connect with the Woodcamp Interpretive Trail, provide trailhead facilities.
- Provide annual maintenance of these trails. The work shall be performed in compliance with Standard Specifications for Construction and Maintenance of Trails EM-7720-1 03 (or equivalent at the time of construction and maintenance). Annual maintenance will include logging out trails, imminent danger tree removal, bridge maintenance (if appropriate), performing spring and fall drainage maintenance (including installing new drainage structures as needed) and loose rock removal. On a 5-year cycle, trail maintenance will also include brush cutting; loose rock and root removal; slough and berm removal; and turnpike, retaining wall, switchback maintenance and other work needed based on trail design. Reconstruction needs (including bridge reconstruction) will be addressed on an “as needed” basis.

Specific Facilities - Milton Reservoir Area

Within 3 years of license issuance:

- Delineate a total of six dispersed campsites, three in the area near the boat launch, and three existing sites west of the launch area, near the dam. Provide parking for 2 cars at each.
- Address accessibility as required in Development Scale 2 campgrounds.
- Place barriers to prevent vehicle use outside of the designated parking area.
- Construct an Outdoor Recreation Accessible Route to toilet from a nearby parking spot.
- Each year, at the Annual Meeting, determine if there is a need for food lockers. If animal problems arise (e.g. bear encounters, plague), install animal resistant food lockers at each campsite the following year.
- Limit shoreline access to one single-lane car-top boat launch with barriers to allow direct vehicle access to the shoreline for boat launching purposes only and prevent driving along shoreline. Gravel boat launch entry above the high and low water mark to prevent resource damage.

Within 15 years of license issuance, rehabilitate or replace toilet.

Specific Facilities - French Lake

Within 5 years of license issuance:

- Grade and gravel the existing parking area and install large rock barriers to keep OHVs from accessing lake.

- Install and maintain trailhead sign.

Specific Facilities - Bowman Reservoir Area

Within 2 years of license issuance, prepare a corridor-wide recreation development and management plan for the Bowman Recreation Corridor in consultation with FS. This corridor should include all land within 1,500 feet north of the Project lake access roads from Bowman Dam on the west, Jackson Creek Campground on the east, and Faucherie Dam on the south, and all land south of the access roads to incorporate Bowman, Sawmill and Faucherie reservoirs, Canyon Creek between Bowman and Faucherie, and 1,500 feet to the south of the reservoirs and creek. This plan shall address:

- Management of both NFS and Licensee land.
- The need to concentrate all overnight camping within 1500 feet of roads into facilities where sanitation, fire prevention, and resource protection are provided for and all other (e.g. boat-in) camping, at a minimum, into designated sites.
- Providing for construction of sufficient facilities to meet current use and projected demand of this area through the term of the license to the degree this is topographically feasible for the entire Bowman to Faucherie area, including Jackson Creek Campground. The minimum resource protection needed to serve overnight visitors at vehicle accessed campsites includes vehicle controls, fire rings, animal resistant food lockers and toilets.
- Implementation of camping restrictions on both NFS and Licensee lands (restricting camping to designated sites only) to coincide with development of additional camping capacity. A restricted camping area designation on NFS lands will need to be addressed through the Commission's NEPA process and subsequent forest order. Additional coordination will be needed with Nevada County sheriff to implement the closures on private and Licensee owned land.
- Assessing the optimal use of the land in this corridor to meet future project-related recreation (due to the limited amount of developable land in the area), including analysis of the physical overnight carrying capacity (based on the suitable land for overnight camping at locations where toilets can be provided.)
- Providing for a variety of experiences appropriate for the recreation opportunity spectrum (ROS), including some sites with more amenities and other sites providing more of a dispersed type (lower density) camping experience but where adequate sanitation and resource protection measures are provided. Group, family and boat-in developed/designated camping opportunities should be addressed.
- Opportunities to meet demand for day use facilities (including boating access and picnicking). In determining if picnic sites should be developed, address the benefits and risk of providing these facilities, since these sites have the potential to become de facto campsites. If picnic sites are provided, develop appropriate management responses to assure picnic sites do not attract frequent overnight use such as hosts and patrols.
- Sanitation and litter control corridor-wide.
- Plans to reduce the resource effects of recreation (including uncontrolled vehicle use and fire).
- Information and education.
- Plans for dispersed campsite conversions, closures and rehabilitation.

- Schedule for implementation and construction.
- Development of a centrally located potable water source in this corridor. User conflicts management.
- Enforcement of regulations.
- User fees with public input and FS approval (facilities on NFS lands).
- Provisions for at least one host site within the basin with potable water and septic or holding tank and power (preferably solar panels, or quiet generator).
- Continue the existing direction to keep OHVs out of Bowman Reservoir under the high water mark (especially at east end/inflow area of the reservoir) via strategic placement of barriers.
- A boat management plan for Bowman and Faucherie Lakes (developed in conjunction with FS, County Sheriff, and other interested agencies) addressing boat speed, motor size, and type of motor (gas or electric). FS 's recommendation for the management for Bowman Lake water surface is for relatively quiet experiences, i.e. non-motorized water craft and limiting the horse power and size of motorized water craft, limiting speeds to under 25 mph, and prohibiting Personal Water Craft.

The Bowman Recreation Corridor Plan is to be approved by FS and other applicable resource agencies. Licensee shall be responsible for the environmental analysis, documentation of the analysis, and construction of all facilities and/or implementation of measures identified in this plan after approval of the plan.

Within 5 years of license issuance:

- Provide minimum of one a potable water system at one of the campgrounds in the Bowman Recreation Corridor. Provide signing at the other campgrounds informing recreationists where they can obtain potable water. If the water system is a single hand pump, then place at a location convenient for campers from other campgrounds, provide a parking space, and strategically place signs within the Bowman Recreation Corridor informing other campers of the potable water opportunity.
- Construct a host campsite within the Bowman Recreation Corridor that includes water (if the potable water system is pressurized provide a hydrant at the host site, if the potable water is a hand pump locate host relatively near hand pump), septic (or holding tank), and preferably power (e.g. solar panels or quiet generator) at the campground where the potable water is provided.

Within 7 years of license issuance:

Implement the camping closure. By that time, through construction of additional facilities, the developed overnight camping capacity should be sufficient to accommodate the mid-summer non-holiday weekend camping use projected for the following 10 years (see the development measures for the reservoirs and facilities within the Bowman Recreation Corridor). In addition to construction, implementation should include:

- Working jointly with FS and County Sheriff to pass ordinances to limit camping (on National Forest System and Licensee lands) to developed campgrounds and designated sites only. The closure should encompass approximately all land within 1,500 feet of roads from Bowman Dam on the west, Jackson Creek Campground on the east, and Faucherie Dam on the south. The corridor may need to be widened or narrowed in a few areas (such as the south side of Sawmill Lake) to meet the intent of allowing boat-in camping on the non-vehicle accessible side of these lakes but limiting camping to designated sites where there is vehicle access.
- Closure, barricading, removal, and restoration of all dispersed campsites in this corridor that are not converted to designated camping or day use sites. Provide appropriate signage and maintain these closures throughout the license period.

Bowman Reservoir

At the Bowman Road/Faucherie Road junction, Licensee shall maintain the 3-panel kiosk (installed in 2011) with current information/interpretation/map of area/recreation opportunities. On the recreation opportunity map, specifically include location of campsites, picnic sites, potable water, trails, boat launches, etc.

Within 2 years of license issuance, Licensee shall close and gate the informal boat ramp on the west end of Bowman Lake, but continue to allow people to carry their water craft beyond the gate to launch. Allow only day use at this site; remove dispersed campsites/fire rings. Provide 3-5 vehicle parking spaces. Post day-use only signs and sign directing those with boats on trailers to east end of Reservoir.

Within 5 years of license issuance, Licensee shall implement the action items identified in the Bowman Recreation Corridor Management Plan (BRCMP) related to Bowman Lake. Specifically, if consistent with the BRCMP, and among the other items identified in the BRCMP:

- Convert the dispersed sites located approximately one-quarter mile west of Bowman CG (“Peninsula” sites on NFS land) to day-use picnic sites (Development Scale 2). This would include designating and controlling parking with barriers to minimize erosion potential, replacing fire rings with bar-b-que grills with self-contained ash boxes, installing tables, providing signage and creating walking paths to the sites. If picnic sites are determined to be not desired at this location, close and rehabilitate these campsites.
- At Bowman Lake, within the Bowman Recreation Corridor, eliminate all dispersed primitive campsites and restrict all camping to formal campground facilities by increasing developed camping capacity.
- Expand camping on developable lands west of the current campground by constructing approximately 20 sites on NFS land (depending on land development capability) in the Tree Camp area (Development Scale 2). There is an estimated capacity for approximately 10 sites south of the road and 10 sites north of the road. This area already has several metal fire rings in place south of the county road. Provide additional toilets to serve these sites (vault toilet 1 stall per 35 PAOT and no more than 500 feet between toilet and campsites).

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Implement the action items identified in the Bowman Recreation Corridor Management Plan (BRCMP) related to Bowman Lake. Specifically, if consistent with the BRCMP, and among the other items identified in the BRCMP. At Bowman Campground:
 - Rehabilitate the existing facilities at Bowman Campground (restroom, tables, fire rings, and signs) (Development Scale 2). Install self-service fee collection station if the Licensee wishes to recoup some of the operating costs.
 - Add two walk-in campsites at the Bowman Campground west of the small drainage on the west end of the current Bowman Campground boundary (tables, fire rings, food lockers (30-cubic feet), tent pads, site markers).
 - Identify and barrier parking spurs sufficiently to prevent indiscriminate driving, and control vehicle access through the campground.
- Prior to the implementation of the “Camping in Designated Sites Only” policy), develop additional designated camping capacity adjacent to the Bowman Lake Campground, east of the Milton-Bowman Canal by either:
 - Developing a 25 PAOT Group campground (Development Scale 2) with a single vault immediately adjacent to the campsite, 5 picnic tables, 2 serving tables, 1 group grill, group fire ring, 4 large food lockers, tent pads and bulletin board. Parking space for at least 9 vehicles, vehicle barriers to sufficiently prevent indiscriminate driving, and self-service fee collection station (if NID desires to recover some of the operational costs), or;
 - Developing a new 7-10 unit family campground (Development Scale 2), or expand the existing Bowman CG, with toilet(s) (1 stall per 35 PAOT), animal resistant food storage lockers, tables, signing, fire rings, vehicle barriers to sufficiently prevent indiscriminate driving, tent pads and self-service fee collection station (if NID desires to recover some of the operational costs).
- Define/construct twenty truck and trailer parking spaces (40 feet long), information panel, (with aquatic invasive materials), use crushed rock in the area of the existing boat ramp. Ramp will accommodate small trailered boats up to 15 feet long. The information panel should also provide “light on the land” resource protecting backcountry camping techniques targeted to boat-in dispersed campers.
- Establish gravel parking area, OHV barriers, and information kiosk at the inflow to the reservoir.

Within 7 years of license issuance: within 1500 feet of roads within the Bowman corridor, eliminate/rehabilitate or convert to picnic sites all the dispersed campsites that are not incorporated into the developed campgrounds (either family or group campground identified above). For dispersed campsites converted to picnic sites, this would include designating and controlling parking with barriers to minimize erosion potential, replacing fire rings with bar-b-que grills with self-contained ash boxes, installing tables, providing signage and creating walking paths to the sites.

Sawmill Reservoir

Within 5 years of license issuance:

- Construct a 25 PAOT Group Campground (near former BSA camp) (Development Scale 2) at least 100 feet away from the water's edge:
 - Install single-unit vault toilet.
 - Facilities shall include five picnic tables, two serving tables, one group fire ring, 4 large animal-resistant lockers, site markers, and gate.
 - Install a Site Identification sign to Forest Service sign standards.
 - Install a three panel information/regulation bulletin board at campground entrance.
 - Install self-service fee collection station at campground entrance (If Licensee desires to recover operating costs).
 - Provide animal resistant garbage containers and garbage service.
 - Barricade roadway and parking area to prevent off road travel.
 - Barrier the existing adjacent informal boat ramp to allow only car-top launching.
- Construct a trail from this campground to the proposed Sawmill Trail and the family campground (See Bowman Recreation Corridor Trail Development).

The following measures on N FS lands are required under Section 4(e) and the measures on Licensee lands are recommended under Section 10(a) of the Federal Power Act.

- Dismantle all dispersed campsites not incorporated and converted into developed campsites.
- Allow boat-in dispersed camping on south shore unless resource degradation occurs.
- Post "Camping at Designated Sites Only" signage at vehicle access points.

Recommendations on Licensee lands:

Within 5 years of license issuance:

- Install info kiosk at day use parking by dam.
- On the north edge of Sawmill Lake, construct a 15-20 unit Development Scale 2 family campground (which may include a few walk-in sites developed on the flat benches at the east end of the campground. Develop parking for walk-in sites prior to the steep terrain (over 20 percent). Campsites should be located at least 100 feet from the lake.
- Enhance the views from the campsites that overlook the lake by selectively thinning trees between the lake and the campsites.
- Facility shall provide: vault toilet in the quantity of 1-stall per 35 PAOT, distributed so that there is no more than 500 feet between a campsite and restroom; 30-cubic foot animal-resistant food storage lockers, site markers, tables, tent pads, and fire rings.
- Construct one lane native-surface road with turnaround and a minimum of one parking spur per campsite (barricaded with boulders to keep vehicles on road and spurs).
- Identify and sign the informal boat launch opportunity at the dam. Improve the road to the boat launch and provide parking for day use only.
- Install an information/regulation kiosk at campground entrance/self-service fee collection station.

Faucherie Lake

Recommendation on Licensee lands:

Within 2 years of license issuance, prevent vehicle access across dam by placing a gate on the west end of the dam.

Within 5 years of license issuance:

- Replace the toilets and picnic tables at Faucherie Group Campground.
- Replace the toilet at the Day Use Area.
- Expand group campground parking, create and sign van accessible parking space.
- Provide trailhead with information board to serve the Sawmill and/or French Lake trails (if either of these trails terminate at Faucherie Lake). (See Bowman Recreation Corridor Trail Development proposal).
- Provide parking signage and an information kiosk addressing the Grouse Lakes non-motorized area at the Faucherie day use/boat ramp area. Include information about fire, sanitation and safety; and interpretive information about the natural resources, such as prevention of the spread of amphibian *chytrid* fungus.

Within 10 years of license issuance:

- Rehabilitate the remainder of the Group Campground facilities including meeting Americans with Disability Act Accessibility Guidelines standards.
- Rehabilitate day use parking area and circulation road (either repave or grind asphalt and convert to graded gravel road (Maintenance Level 3)).
- Rehabilitate informal boat ramp, block at high water mark and sign for car-top launch only. Designate a minimum of two load/unloading parking spaces just uphill of the barrier.
- Address opportunities to provide vegetative screening between the two group units or move units farther apart to provide privacy, if feasible.

Canyon Creek Area

Canyon Creek Campground

Within 5 years of license issuance, Licensee shall:

- Reconstruct as a Development Scale 3 campground and make 100 percent accessible, or to the degree topographically feasible.
- Redesign and convert the west end of the campground into a minimum of a 25 PAOT group site. Provide group campground facilities including 2 serving and 5 picnic tables, a group campfire ring, group grill, tent pads, and graded cooking area. If in the Bowman Recreation Corridor Management Plan it is determined that there is not a sufficient projected demand for group camping in this area to justify a group campground, decommission this portion of the campground.

- Replace the two restrooms. Provide paved or compacted graveled turnout in front of each toilet.
- Provide large food lockers (minimum 30-cubic foot) for each site and four lockers for the 25 PAOT group camp.
- Provide an information/interpretive display about the recreation opportunities in the area. Include information about fire, sanitation and safety; and interpretive information about the natural resources (including protection of resources, such as prevention of the spread of amphibian *chytrid* fungus and aquatic invasive mussels).
- Install a self-service pay station (if Licensee wishes to recover some of the operating costs) with three-panel information board and provide a paved or compacted gravel parking turnout adjacent to the entrance station.
- Provide road surface treatment of all interior campground roads and spurs as prescribed by the Pavement Management System. Or, grind up asphalt once it has deteriorated and relay/compact to a Maintenance Level 3 Road and spurs.
- Provide a paved or compacted gravel parking turnout adjacent to the entrance station.

Canyon Creek Dispersed Sites

Within 5 years of license issuance:

- Create a new linear layout 10-15 unit Development Scale 2 campground that maintains some of the dispersed “feel” of the existing dispersed campsites along Canyon Creek. Maintain 100 feet distance from the creek’s edge. Incorporate the existing 6-8 dispersed campsites to east of the existing campground up to the culverts within a mature stand of trees. Develop 4-7 additional campsites in a similar layout along Canyon Creek.
- Install two 1-unit vault toilets to service all 10-15 sites in a layout so that there is no more than 500 feet between toilets and the campsites, and a minimum of one toilet per 35 PAOT.
- Rather than expand the formal campground by constructing extensive road system, use existing native surface spurs off main road as “campsite” spurs and keep the “dispersed” feel to the sites, or create new native surface spurs of similar design for new sites. Place rock barriers around spurs to prevent vehicles from driving beyond the spurs.
- Install table, food locker, fire ring, tent pads, and site marker at each site.
- Install a Site Identification sign (FS sign standard), entrance station, and signs.
- Install a self-service pay station if Licensee wishes to recover some of the operating costs.
- Remove and restore all remaining dispersed sites along Canyon Creek that are not incorporated into the expansion of Canyon Creek Campground.

Jackson Creek Campground

At the Bowman Road/Faucherie Road junction, maintain the 3-panel sign (installed in 2011) for information/interpretation/map of area with current information and recreation opportunities, i.e. show campgrounds, location of potable water, etc.

Within 10 years of license issuance, redesign and reconstruct as a Development Scale 3 campground, including:

- Evaluate opportunity to provide accessibility at all campsites and (to the degree topographically feasible) implement these opportunities.
- Replace double-unit toilet with two single-unit accessible toilets to reduce distances between campsites and toilets. Provide paved or graveled turnout in front of each toilet, and access route to the toilet entrances.
- Replace bulletin boards and signs.
- Replace wood barriers with rock barriers and replace unit markers
- Replace fire rings and picnic tables
- Reconstruct entrance station and signs. Install a self-service pay station if Licensee wishes to recoup some of the operating costs.
- Install animal resistant food storage lockers (minimum 30-cubic feet).
- Pave or gravel all interior campground roads and spurs. Include a paved or graveled parking turnout adjacent to the entrance station.

Bowman Recreation Corridor Trail Development

Sawmill Trail

If not completed under the current license, within 2 years of license issuance, construct and maintain one of the following:

- At or near Sawmill Lake construct a pedestrian bridge crossing (to current FS Trail Bridge Standards at the time of design) over Canyon Creek, or walkway across Sawmill Spillway to enable recreationists to safely access Grouse Ridge Trail, and trail connections to the existing Grouse Ridge Trail and parking area by the dam. This alternative occurs on Licensee lands.
- A trail from the family and group campgrounds along the north east shoreline and around the east end of Sawmill Lake, bridge across Canyon Creek and connect to the Grouse Ridge Trail on the south side of Sawmill Lake. This alternative occurs on NFS lands.
- Utilize the day use parking opportunity at Faucherie to also serve as a trailhead, construct an approximately 2-mile primitive trail from Faucherie to Sawmill Lake on the south side of Canyon Creek (no bridge needed). This alternative occurs on both Licensee and NFS lands.

The primitive trail would be a Trail Class 2 single-track (12-18 inches wide), natural surface tread trail with a general grade of 10 percent slope or less and stretches up to 20 percent for up to 200 feet and 30 percent up to 50 feet (over rock). Due to sections of solid rock terrain, cairns, and other small signs may be utilized in these short segments to identify the trail tread and be used to keep visitors on the designated trail.

French Lake Trail

Construct and maintain one of the following (the portions of these trails on NFS lands are required under Section 4(e) and the portions of these trails on Licensee lands are recommended under Section 10(a) of the Federal Power Act):

- An approximately 2-mile primitive trail (Trail Class 2) from Faucherie Lake to French Lake with a pedestrian bridge over Canyon Creek below the Faucherie spillway.
- An approximately 3-mile primitive trail (Trail Class 2) from FS 843 -37 Road, at the bend below the large culvert crossing of Canyon Creek, to French Lake (no bridge needed). Create a trailhead with parking for 6-10 vehicles near the start of the trail and provide information panels. Coordinate the location of toilet for the Canyon Creek Dispersed Site Conversion to a developed campground to also serve the trailhead toilet.

The trail would be a Trail Class 2 single-track (12-18 inches wide) natural surface tread trail with a general grade of 10 percent slope or less and stretches up to 20 percent for up to 200 feet and 30 percent up to 50 feet (over rock). Due to sections of solid rock terrain, cairns and small signs may be utilized in these short segments to identify the trail tread and be used to keep visitors on the designated trail.

Other Trail Measures

- Provide assurances of a perpetual public right to use the trails constructed and currently existing (Grouse Ridge Trail) on Licensee land. This could be through the grant of an easement to non-governmental organization or appropriate agency; an exclusive easement to FS on standard USDA Forest Service form providing the U.S. jurisdiction over the trails developed on Licensee lands including rights to grant the use of the trail to other agencies and members of the public; or other assurances of perpetual access for the public to use the trails and, if appropriate, the right of access to FS to maintain the trail.
- Install trail and lake directional signs at the trail entry points.
- Provide trail system information on a bulletin boards and kiosks in the Bowman Recreation Corridor.
- Provide maintenance on the French Lake, and if applicable, the Faucherie to Sawmill trail annually. Work shall be performed in compliance with Standard Specifications for Construction and Maintenance of Trails EM-7720- 103 (or equivalent at the time of maintenance). Annual maintenance will include logging out trails, imminent danger tree removal, drainage maintenance (including installing new drainage structures as needed), bridge maintenance and loose rock removal. On a five year cycle, trail maintenance will also include brush cutting; embedded rock and root removal; slough and berm removal; and (if appropriate) turnpike, retaining wall and switchback maintenance. Reconstruction needs (including bridge reconstruction) will be addressed on an “as needed” basis.

Lang’s Crossing

Within 5 years of license issuance, Licensee shall work cooperatively with FS and Licensee for Yuba-Bear Hydroelectric Project to equitably share responsibility amongst the three entities for providing the following facilities on NFS lands adjacent to Bowman Road at Lang’s Crossing:

- A single unit vault toilet.
- A gravel parking area for a minimum of 10 vehicles.
- A 3-unit picnic site with tables and barbecue grills with self-contained ash boxes.

- If litter is not adequately addressed through a pack-in/pack-out trash management strategy, as determined by annual monitoring, then provide trash containers and service.

Specific Facilities – Bear River Corridor

Bear River Trail Project

Recommendation on Licensee lands:

- Cooperate with trail planners to determine the alignment of the trail across Licensees' lands along Bear River, including Project canals, and for trailheads on Licensees' lands.
- Provide for the perpetual public access and use of the trail and roads to reach the trail across Licensee lands. Easements could be held by Placer and Nevada counties in their respective jurisdictions, or by a Land Trust entity (e.g. Bear Yuba Land Trust).
- Provide support for trailhead development, sanitation and signage needs related to the trail on Licensee lands.

Recreation Plan Revision

Licensee shall revise the Recreation Plan when substantial changes occur. Factors that may trigger a revision include but are not limited to:

- Revisions and updates to FS, BLM, or other applicable management plans.
- Substantial changes (>25 percent change) of Recreation Visits in any activity recreationists of the Project participate in, as revealed in the National Visitor Use Monitoring (NVUM) of the Tahoe National Forest (using the 2010 surveys as a base), similar survey conducted by FS/BLM or documented in Licensee's periodic observation and recreation survey.
- Documented substantial changes in demographic use patterns (e.g. increases in size or amount of RV use, changes in types of boats using the lake), visitor needs, recreation preferences, types or patterns of use, season of use changes (such as school schedule changes) or other social factors affecting recreation facilities within the Project area.
- Changes in road maintenance standards or similar physical factors affecting the use of the recreation facilities within the Project area.
- Reaching occupancy (or other) triggers where new, but previously unanticipated, facilities will be required.
- Catastrophic natural events, such as major forest fires or natural disasters, and significant effects of social disorder.
- New federal or state policies, regulations, and laws (including Wilderness designation of land within or near the Project) that significantly affect recreation resources in the Project area.
- Acquisition by FS of non-licensee private land around project lakes which would allow for improvements where there is a demand, but suitable land was previously unavailable for construction of such improvements.

Frequency of revisions to the Recreation Plan shall be based on consultation among Licensee, BLM, and FS. Agreed upon changes to this Plan will be incorporated into a revised document or an

amendment to this document, and after approval by FS and BLM, the revised plan will be submitted to THE COMMISSION for approval.

Costs of Managing Project-Related Recreation

Within 1 year of license issuance, Licensee shall coordinate with FS and BLM to develop a plan to address the costs of managing the Project-related recreation on NFS and BLM lands. In addition to addressing the management of the Project facilities, this component shall address, at a minimum, the following:

- Monitor and seek compliance with safety, camping closures, fire clearance, fire restrictions, and other measures.
- Patrol, or provide for patrols, through fire season with personnel that have the ability to extinguish abandoned and escaped campfires, and perform fire prevention duties.
- Provide for patrols, through the recreation season (including the peak season— generally Memorial Day to Labor Day; and the shoulder season which generally lasts through mid-October) with personnel that have the authority to enforce federal 36 CFR 261 regulations on NFS lands.
- Install and maintain signs; adjust as seasonally needed.
- Disperse information to the public including appropriate OHV and firearm use, campfire safety, leave no trace, and other messages to reduce resource impacts and inter-user conflicts.
- Patrol dispersed public use areas within one-quarter mile of all Project lakes and Project-affected waterways.
- Monitor and report vandalism of facilities, cultural sites or other resource damage.
- Report illegal activities and cooperate with law enforcement agencies.
- Monitor and seek compliance with regulations associated with camping, parking, food storage, whitewater boating, and other uses.
- Remove trash, remove evidence of human waste, and clean fire rings from dispersed campsites and other areas of concentrated public use within 1/4 mile of all Project and Project-affected waterways.
- Maintain fuels clearance within 100 feet of all dispersed campsites (including fire clearance around Project-provided steel fire rings and user created fire rings) surrounding Project lakes.
- Remove visitor created fire rings in areas where camping is limited to designated sites.
- Perform other duties that provide for the safety of the public and protection of Project-affected resources.
- Maintain a log of activities, key resource issues, and public concerns to summarize in an annual report provided at least 30 days prior to the Annual Coordination Meeting.
- Coordinate with county sheriff for provided services.
- From May through October provide monthly detailed inspection and reporting of facility maintenance and management to assure they are operated to FS standards.

Condition No. 42 – Visual Resource Management Plan

Licensee will, in consultation with FS, finalize the plan provided in the Final License Application and submit for FS approval. Once the plans are complete, they will be included as part of this condition.

Condition No. 43 – Historic Properties Management Plan

Within 1 year of license issuance, Licensee shall file with the Commission a Historic Properties Management Plan (HPMP) that is approved by FS. The HPMP will be tiered to an anticipated Programmatic Agreement (PA), to which FS requested to be signatories, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. Licensee shall consult with the State Historic Preservation Officer (SHPO), applicable Native American Tribes, FS, and other applicable agencies during the finalization of the HPMP. Consultation for the finalization of the HPMP shall consist of field (as appropriate) and office meetings.

If, prior to or during ground disturbance or as a result of Project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on NFS lands, as appropriate, and Licensee adjoining property, Licensee shall immediately cease work in the area so affected. Licensee shall then notify FS and shall not resume work on ground disturbing activities until it receives written approval from FS.

If it deems it necessary, FS may require Licensee to perform recovery, excavation, and preservation of the site and its artifacts at Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by FS.

Condition No. 44 – Transportation System Management

Within 1 year of license issuance, Licensee shall file with the Commission a Road and Transportation Facility Management Plan, approved by FS, for protection and maintenance of Project and Project-affected roads that are on or affect NFS lands. Licensee shall consult with FS and other affected parties in the development of this Plan. Licensee shall take appropriate measures to meet applicable FS and BLM Maintenance Levels, Traffic Service Levels, and Road Management Objectives (RMOs). Upon Commission approval, Licensee shall implement the Plan.

Project Roads

Table 6 below contains the Project Roads and Segments that are to be included in the Road and Transportation System Management Plan. Table 6 includes condition ratings, which are from Licensee Roads and Trails Study. Within 1 year of license issuance, Licensee shall improve the roads listed in poor condition to meet FS standards described below.

Table 6. Project Roads

Licensee Road ID Number	Road Name	Forest Service Road ID Number ¹	Ownership (Length may or may not be on entirely on	Maintenance Level	Condition	Total Length (mi)
YBBAL_001	Alarm B Rd	UA16111901	Forest Service	2	Poor	1.5
YBBND_001	Bowman Dam Access Rd	UA18 120501	Forest Service	2	Poor	0.3
YBBNK_001	Bunkhouse Rd	UA18 12050	Forest Service	2	Good	0.1
YBBSC_004	Box Car Section Rd	UA18123002 and UA18123001	Forest Service	2	Poor	1.3
YBBSC_006	Bowman-Spaulding Berm Rd	UA18113602	Forest Service	2	Good	3.5
YBDFI_001	Dutch Flat No.2 Conduit Intake Access Rd.	UA16111804	Forest Service and PGE	2	Poor	0.4
YBFL_001	French Lake Rd	0843-020	Forest Service	2	Poor	2.1
YBJMO_001	Low Level Access Rd	TBA ¹	Forest Service	2	Good	0.15
YBMBP_001	Pipeline Outlet Access Rd	TBA ¹	Forest Service	2	Poor	1
YBSCS_001	Stump Canyon Intake Access Rd	UA16102301	Forest Service	2	Poor	0.9
YBSCS_003	Stump Canyon Siphon Outlet Access Rd	UA16102701	Forest Service	2	Good	0.7
Y BWCD_001	Willow Creek Diversion Rd	TBA ¹	Forest Service	2	Poor	0.2
-	East Meadow Campground Access Rd	0070-080	Forest Service	3	Good	0.3

¹ TBA–TO BE ASSIGNED; These Forest Service Road Numbers need to be assigned by FS

Recreation Facilities Roads Included in the Roads and Transportation Plan

Table 8, below, includes the Recreation Facility Roads (including but not limited to recreation access roads, campground loops and spurs, parking areas, etc.) that are on or affect NFS lands. These roads shall be included and incorporated in the Road and Transportation Management Plan. All applicable requirements of the Plan shall be addressed on these roads in addition to what is necessary to execute the Recreation Plan.

Table 8. Recreation Facility Associated Roads Included as Project Roads

Licensee Road ID Number	Project Reservoir	Recreation Facility Name	Lands	Road Name	Forest Service Road ID Number	Total Length (mi)
RR01	Jackson Meadows	East Meadow Campground	Forest Service	Unknown	70-80-10	0.505
RR02	Jackson Meadows	Pass Creek Campground	Forest Service	Unknown	TBA ¹	0.305
RR03	Jackson Meadows	Pass Creek Overflow Campground	Forest Service	Unknown	301-65-1	0.150
RR04	Jackson Meadows	Pass Creek Boat Launch	Forest Service	Unknown	301 -65	0.330
RR05	Jackson Meadows	Aspen Group Campground	NID	Unknown	301-55	0.185
RR06	Jackson Meadows	Aspen Picnic Area	Forest Service	Unknown	301 -52	0.215
RR07	Jackson Meadows	Sanitary Dump Station	NID	Unknown	TBA ¹	0.110
RR08	Jackson Meadows	Jackson Meadows Vista	Forest Service	NA	TBA ¹	NA
RR09	Jackson Meadows	Woodcamp Access Road	Forest Service	Unknown	956-2	0.730
RR10	Jackson Meadows	Findley Campground	Forest Service	Unknown	TBA ¹	0.295
RR11	Jackson Meadows	Fir Top Campground	Forest Service	Unknown	TBA ¹	0.180
RR12	Jackson Meadows	Woodcamp Campground	Forest Service	Unknown	TBA ¹	0.265
RR13	Jackson Meadows	Woodcamp Picnic Area	Forest Service	Unknown	TBA ¹	0.180
RR14	Jackson Meadows	Woodcamp Boat Launch	Forest Service	Unknown	TBA ¹	0.155
RR15	Jackson Meadows	Silvertip Group Campground	NID	Unknown	TBA ¹	0.180
RR16	Jackson Meadows	Administrative Site	Forest Service	Unknown	956-15	0.145
RR17	Milton Diversion Impoundment	Day Use Area/Hand Launch	Forest Service	NA	TBA ¹	NA
RR18	Milton Diversion Impoundment	Primitive Campsites	Forest Service	NA	TBA ¹	NA
RR19	French Lake	No facilities	Forest Service	NA	TBA ¹	NA
RR20	Bowman Lake	Bowman Lake Campground & Boat	NID	Unknown	TBA ¹	0.310

RR21	Sawmill Lake	Sawmill Lake Campground	NID	Unknown	TBA ¹	NA
RR22	Sawmill Lake	Sawmill Lake Group	Forest Service	Unknown	TBA ¹	NA
RR23	Canyon Creek	Canyon Creek Campground	Forest Service	Unknown	TBA ¹	0.280
RR24	Faucherie Lake	Faucherie Lake Group	NID	Unknown	TBA ¹	0.065
RR25	Faucherie Lake	Faucherie Lake Day Use	NID	Unknown	TBA ¹	0.145

1 TBA–TO BE ASSIGNED; These Forest Service Road Numbers need to be assigned by FS

Planning and Inventory

At a minimum, the Roads and Transportation Plan shall include the following components.

- Map(s) in electronic format compatible with FS Travel Management Routes and GIS database showing all Project, Project Recreation and Project-affected roads, culverts, bridges, drainages, watering sources, signs, gates, hazards, sensitive resource areas, erosion features , borrow and disposal sites for surplus rock and soil from road maintenance within and adjacent to the FERC Boundary.
- Table(s) in electronic format identifying uses (e.g. recreation, facility access) of the roads and season of operation, FS road identification number, Licensee’s road identification number, ownership, maintenance level, condition, length, road dimensions, surface type, mile posts, and other identifiers.
- An inventory table in electronic format of all road and road facility conditions including any construction or maintenance needs. Identify each Project Roads and identify how and when it will be addressed further. All road/ segments on National Forest System Lands listed in poor condition shall be repaired within the 1 year of License issuance.
- A Traffic Safety and Signing Component, including an inventory and condition for existing and proposed traffic/road signs and a schedule for sign maintenance for all Project Roads. Include road identification signage consistent with Motorized Travel Management Direction and directional signage that is prominent and clearly guides the public to and from each recreation facility. The directional signs shall be placed as needed to clearly direct people to and from the Project Facilities and may not be solely on Project Roads. The sign component shall be approved by FS. The sign component shall meet all current MUTCD and FS requirements;
- Within 1 year of license issuance, Licensee and FS will review the existing FS inventory of illegally built user created routes coming off Project Roads or other facilities such as pipelines, ditches, etc. and develop a plan, including a schedule, to rehabilitate and barricade the affected areas.
- Any proposed changes to maintenance levels.

Operation, Maintenance, and Road-Associated Debris

- Develop and submit for FS approval annual road operation and maintenance (O&M) schedule for Project Roads on NFS lands to comply with FS standards, specifications, RMOs, BMPs including all state requirements, and Travel Management guidelines;
- Complete normal maintenance activities on an annual basis including: road surface maintenance, repair and replacement of damaged culverts, cleaning debris and rockfall from drainage channels, vegetation removal to allow adequate sight distances, vegetation removal to maintain an open traveled way consistent with FS standards.
- Develop and implement a Pavement Management System, approved by FS to economically maintain and extend the life of pavement on Project and Recreation Roads by tracking pavement surface condition and guiding in the schedule of repairs. Include repairs in the annual program of work. Examples of components that will be included in the Pavement Management System are
 - A rating of pavement condition identifying good, fair and poor pavement by a qualified individual
 - Assigning importance ratings for road segments, based on traffic volumes, road functional class, and user demand to guide in priority of work and repairs
 - A schedule of maintenance for good roads to keep them in good condition
 - A schedule of repairs for poor and fair pavements
- Describe types of road-associated debris (e.g. native materials such as dirt, rocks, trees, etc.), any acceptable locations on NFS lands where this material can be stored (identify if temporary only or permanent), and measures to control erosion, weed infestation, etc. on these piles. Remove all road spoil piles not currently located at approved sites on NFS lands to a location either off the Forest, or to a FS approved disposal site.
- Include any required limited operating periods (LOPs) for wildlife species and noxious weed prevention provisions in planning and performing maintenance activities.
- Comply with all State and FS, specifically Tahoe National Forest, guidance and direction for prevention and management of noxious weeds on areas that are on or affect NFS lands.
- Comply with all current FS O&M guidelines.
- Provide for fish and aquatic passage and proper stream function for all stream crossings that are identified as fish habitat areas.
- When replacing culverts and other stream crossings on NFS land, Licensee shall adhere to design guidelines appropriate for the FS level designation for the road.

Construction and Reconstruction

- Develop a road construction and reconstruction implementation schedule to bring existing roads and associated facilities (i.e. culverts, gates, bridges, crossings, cribwalls, barricades, etc.) into compliance with FS standards that achieve FS RMOs and Motorized Travel Management Guidelines for Project Roads. The schedule shall ensure that Project Roads are in compliance with these standards within 5 years of completion of the Plan with roads listed in poor condition to be brought up to standard within year 1 after license issuance and all others by year 5 after license issuance.
- During construction and reconstruction activities, comply with all current FS O&M.

Monitoring

- Within the first year of license issuance, unless waived by FS, conduct traffic use surveys approved by FS. The traffic use survey will be at FS designated locations on Project Roads. Thereafter, conduct traffic surveys every 6 years (coincident with the Commission's recreation Form 80 schedule) at FS-specified locations, to determine the number and type of vehicles per day, describe study periods and reporting requirements, and determine use trends. Conduct a minimum of 60 survey days during survey years.
- Conduct a road capacity and use review every 6 years following completion of use surveys, to determine if the roads continue to meet current road management objectives. If FS determines roads no longer comply, define actions and timelines to correct deficiencies;
- Following annual or periodic monitoring, any roads or bridges found to not meet FS standards and guidelines requiring work beyond normal O&M shall be identified. This list, along with proposed measures to bring the roads or bridges into compliance, shall be submitted to FS at least 30 days prior to the Annual Consultation Meeting required under Condition No. 1, or as needed.

Condition No. 45– Fire Management and Response Plan

Within 1 year of license issuance, Licensee shall complete, in consultation with FS, BLM, Cal Fire, potentially affected Tribes, and other interested parties, and approved by FS, a Fire and Fuels Management Plan (FFMP). The plan shall set forth in detail Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to Project operations. Upon Commission approval, Licensee shall implement the Plan.

Minimum components include, but may not be limited to:

- Fuels Treatment/Vegetation Management: Identification of fire hazard reduction measures and reoccurring maintenance measures to prevent the escape of project- induced fires.
- Fire Prevention and Patrol: Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access. Identify water drafting sites and other fire suppression resources.
- Emergency Response Preparedness: Analyze fire prevention needs including equipment and personnel availability.
- Reporting: Licensee shall report any project related fires immediately to FS.
- Fire Control/Extinguishing: Provide FS a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Condition No. 46 – Review of Improvements on National Forest System Lands

If during the term of the License the Commission determines that the project involves the use of any additional National Forest System (NFS) lands, outside the current project boundary, Licensee shall obtain a special use authorization from FS for the occupancy and use of such additional NFS lands. Licensee shall obtain the executed authorization before beginning any ground-disturbing activities on NFS lands outside the FERC boundary covered by the special use authorization,

and shall file that authorization with the Commission if the activity is related to the Project. Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed occupancy and use that FS needs in order to make a decision concerning issuance of a special use authorization.

If, during the term of the License, Licensee proposes to perform any project construction work, Licensee shall obtain a construction temporary special use authorization from FS before beginning any ground-disturbing activities on NFS lands outside the FERC boundary. The special use authorization will include appropriate vegetation management and erosion control measures as needed to protect NFS lands and resources. Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed construction that FS needs in order to make a decision concerning issuance of a construction temporary special use authorization. Licensee may commence ground-disturbing activities authorized by the License and construction temporary special use authorization no sooner than 60 days following the date Licensee files FS temporary special use authorization with the Commission, if the temporary special use authorization is related to Project activity, unless the Commission prescribes a different commencement schedule. In the event there is a conflict between any provisions of the License and FS special use authorization, the special use authorization shall prevail to the extent that FS, in consultation with the Commission, deems necessary to protect and utilize NFS resources.

Attachment 1. Monitoring indicators, methods, triggers and triggered actions for hosted/reservation campgrounds and self-pay/no-host campgrounds, day use facilities and primitive campsites.

HOSTED/RESERVATION CAMPGROUNDS		
Monitoring Indicator and Conditions		<p>INDICATOR: Non-holiday weekend day (Friday and Saturday) occupancy</p> <p>SEASON: June 15-August 15</p> <p>CONDITIONS:</p> <p>The non-Holiday weekend (Fri (night)/Sat (night)) combined annual peak season (June 15 to August 15) average occupancy for similar campground types within the geographic groupings shown in Table 2. Campground host sites are exempt from this annual average peak season combined occupancy calculation.</p> <p>The single highest and lowest occupancy during the peak season will be omitted from the average occupancy count to minimize the influence of anomalous days (i.e. bad weather, events...). For a typical year, this will result in 14 days (Fri/Saturday nights) for the annual peak season combined occupancy calculation.</p> <p>The occupancy will only be calculated for days when the campground is open during the peak season. In a particular year, if there are less than 10 days to calculate the annual peak season combined occupancy, then this year will not be considered for trigger</p>
1	Phase	Data
	Collection Method 1	DATA COLLECTION METHODS: 1) Family Campgrounds: daily occupancy collected by host/caretaker ¹ , or if applicable reservation records, or other agreed upon methods; and, 2) Group Campgrounds: daily paid reservation records. <i>Note: Any unoccupied, but reserved site will be considered "occupied" for the trigger calculation.</i>
	Trigger 1	90% Average Annual Occupancy of campsites within geographic grouping in 1- year out of 6-year rolling period.
	Action if Trigger 1 is Not Met	Continue monitoring method for Trigger 1.
	Action if Trigger 1 is Met	<p>Perform Suitability-Feasibility² analysis no later than the calendar year after Trigger 1 is met</p> <p>Start Method 2 monitoring</p> <p>Implement recreation use management process³ starting in calendar year after trigger is</p>
2	Phase	Data
	Collection Method 2	DATA COLLECTION METHODS: 1) Family Campgrounds: daily occupancy collected by host/caretaker ¹ , or if applicable reservation records or other agreed upon method; and 2) Group Campgrounds: daily paid reservation records. <i>Note: Any unoccupied, but reserved site will be considered "occupied" for the trigger calculation.</i>
	Trigger 2	95% Average Annual Occupancy of indicator reached two additional times during the 6-year rolling period. Do not have to wait for all 6 years if Trigger 2 is met sooner.
	Action if Trigger 2 is Not Met	Revert back to 6-year rolling annual monitoring (Method 1).
	Action if Trigger 2 is Met	Start Site Development Process for new campground (NEPA analysis and conceptual design, Final Plan Development and Construction to follow NEPA) or , if the FS decision is to not develop a new facility, continue implementation of recreation use management processes ¹ as agreed upon. .

ELF-PAY/NO HOST CAMPGROUNDS, DAY USE FACILITIES, and PRIMITIVE CAMPSITES		
Monitoring Indicator and Conditions		INDICATOR: Non-holiday Saturday occupancy
		SEASON: June 15-August 15
		CONDITIONS:
		<p>The non-Holiday weekend (Sat) combined annual peak season (June 15 to August 15) average occupancy for similar campground/day-use types within the geographic groupings shown in Table 2.</p> <p>The single highest and lowest occupancy during the peak season will be omitted from the average occupancy count to minimize the influence of anomalous days (i.e. bad weather, events...). For a typical year, this will result in 6 Saturdays for the annual peak season combined occupancy calculation.</p> <p>The occupancy will only be calculated for days when the campground/day-use is open during the peak season. In a particular year, if there are less than 4 days to calculate the</p>
Phase	Data	DATA COLLECTION METHODS: On-site observations every 3rd and 6th years within the 6 year Form 80 Cycle: Record non-holiday weekend facility occupancy rates on all Saturdays from June 15 to August 15. Counts will be conducted after noon.
1	Collection Method 1	
	Trigger 1	90% average annual occupancy or above of indicator reached during one of the monitoring years (Year 3 or Year 6).
	Action if Trigger 1 is Not Met	Revert back to Phase 1 monitoring (every 3 rd and 6 th years during FERC Form 80 Cycle).
	Action if Trigger 1 is Met	<p>Perform Suitability-Feasibility² analysis no later than the calendar year after Trigger 1 is met.</p> <p>Start Method 2 monitoring</p> <p>Implement recreation use management process¹ starting in calendar year after trigger is</p>
Phase	Data	On-site observations annually for next 3 years: Record non-holiday weekend facility occupancy rates on all Saturdays from June 15 to August 15. Counts will be conducted after noon.
2	Collection	
	Trigger 2	<p>Average Seasonal Occupancy during the 3 additional years of monitoring for combined facilities in the same grouping (see Table 2 for groupings) meets or exceeds:</p> <p>90% Average Seasonal Occupancy each year</p>
	Action if Trigger 2 is Not Met	Revert back to monitoring every 3 rd and 6 th years during the Form 80 monitoring cycle (Method 1).
	Action if Trigger 2 is Met	Start Site Development Process for new campground (N EPA analysis and conceptual design, Final Plan Development and Construction to follow NEPA) or , if the FS decision is to not develop a new facility, or continue implementation of recreation use management processes ¹ as agreed upon.

¹ Forest Service may monitor host/caretaker occupancy data or conduct data collection independently to verify accuracy.

2 Feasibility/Suitability:

Before site development planning, the monitoring program provides for a feasibility and suitability analysis to determine if site development is possible at a Project reservoir or Project reservoirs within a facility monitoring grouping (Table 2). A proposed development will be considered suitable, if the development is: 1) practical and reasonable based on the site conditions; 2) appropriate for the ROS Class regulations, standards and policy; and 3) appropriate for the level of use desired based on direction by applicable land and resource management plans ,

including revisions or amendments to land management plans. Further, NID on NID land, and the Forest Service on NFS land, will make the final determination as to whether a proposed development is considered suitable and feasible. A proposed development will be considered suitable and feasible if the development is:

1. Practical and reasonable based on the site conditions;
2. Appropriate for the ROS Class setting established for the lands; and
3. Appropriate for the level of use desired based on direction by applicable land management plans, including revisions or amendments to land management plans.

Examples of Recreation Use Management Processes:

- Educate visitors about other regional day-use areas and campgrounds.
- Implement more on-site management (provide camp host, bring in amenities).
- Implement a fee for use (if applicable).

Overflow:

For all infrastructure items, especially campgrounds, the Licensee will also address overflow facilities at this time. Specifically, the Licensee must address any potential overflow impacts, especially in regard to impacts to natural resources. In particular, the Licensee must address controlling motor vehicles (signing, barriers) and human waste (CXT or portable toilets). Typically these overflow areas will not include additional amenities (picnic tables, fire rings, tent pads), but could do so if the Licensee and the resource agency(s) agree to provide such. Address during annual O & M meeting between licensee and FS.

Table 2. Yuba-Bear Hydroelectric Project: Monitoring Trigger Groupings.

	Facility Type	Grouping	Reservoir	Facility	Indicator Capacity*
FAMILY AND GROUP CGs FAMILY AND	Family Campground	Jackson Meadows	Jackson Meadows	East Meadow Campground	45 units
				Pass Creek Campground	29 units
				Findley Campground	14 units
				Fir Top Campground	12 units
				Woodcamp Campground	19 units
		Jackson Meadows	Jackson Meadows	Pass Creek RV Overflow	TBD**
		Rollins	Rollins	Orchard Springs Campground	101 units
				Greenhorn Campground	79 units
				Peninsula Campground	67 units
				Long Ravine Campground	85 units
		Bowman Recreation Corridor	Bowman	Bowman Lake Campground	10 units
			Canyon Creek	Canyon Creek Campground	16 units
			Sawmill	Sawmill Lake Campground (proposed)	15-20 units
				Jackson Creek Campground	12-units

		Jackson Meadows	Jackson Meadows	Aspen Group Campground	3 units (100 PAOT)
				Silvertip Group Campground	2 units (50 PAOT)
				Sawmill Lake Group Campground (proposed)	1 unit (25 PAOT)
				Faucherie Lake Group Campground	2 units (50 PAOT)
				Bowman Lake Group Campground (proposed)	1 unit (25 PAOT)
				Canyon Creek Group Campground	1 unit (25 PAOT)
		Bowman Area	Bowman		
	Group Campground	Bowman Area	Bowman continued		
	Group Campground	Bowman Area	Bowman continued		
	Facility Type	Grouping	Reservoir	Facility	Indicator Capacity*
GROUP CGs	continued	continued		(proposed)	
continued					

* Site capacities will change as Project development plans are implemented. Use current available capacity at time of survey.

** Jackson Meadows RV overflow sites to be tracked separately from family campgrounds to determine demand for oversized vehicle “parking lot” style campsites. Capacity for these sites will vary during the season since lower water levels will increase availability sites when Pass Creek Overflow is not needed for boat ramp parking. Additional 20 family and 50 PAOT group sites constructed at Jackson Meadows will also be included in capacity, when constructed.

Table 2. (continued)

	Facility Type	Grouping	Reservoir r	Facility	Indicator Capacity*
DAY USE AREAS AND PRIMITIVE CAMPSITES	Primitive/ Hike-In Campground	Jackson Meadows	Milton	Primitive campsites (proposed) Fire ring and parking spur	6 units
		Bowman Recreation Corridor	Bowman, Sawmill, Canyon Creek, Faucherie	Within 1/4 mile each side of road - All dispersed campsites to be either converted and included in a developed CG or eliminated	NA
			Bowman, Sawmill, Faucherie	Outside of 1/2 mile camping restriction corridor.	None primitive campsites designated
	Boat-In Campground	Jackson Meadows	Jackson Meadows	Jackson Point Boat-In Campground	8 units
	Boat Launch Facility	Jackson Meadows	Jackson Meadows	Pass Creek Boat Launch	43 spaces
				Woodcamp Boat Launch	36 spaces
		Rollins	Rollins Reservoir	Orchard	150 spaces
				Springs Boat	
				Greenhorn Boat Launch	108 spaces
				Peninsula Boat Launch	50 spaces
				Long Ravine Boat Launch	72 spaces

* Site capacities will change as Project development plans are implemented. Use current available capacity at time of survey.

Table 2. (continued)

	Facility Type	Grouping	Reservoir r	Facility	Indicator Capacity*
DAY USE AREAS AND PRIMITIVE CAMPSITES (continued)	Informal Launch Facility	Milton	Milton	Milton Informal Boat Launch	FS and Licensees will meet on the ground to determine capacity numbers.
		Bowman Corridor	Bowman	Bowman Lake Informal	FS and Licensees will meet on the ground to determine capacity numbers.
			Sawmill	Sawmill Informal	FS and Licensees will meet on the ground to determine capacity numbers.
			Faucherie	Faucherie Informal	14 spaces (shared with Day Use)
	Picnic Facility	Jackson Meadows	Jackson Meadows	Aspen Picnic Area	11 units, 30 spaces
				Woodcamp Picnic Area	6 units, 35 spaces
	Parking Facility	Jackson Meadows	Jackson Meadows	Jackson Meadows Vista	8 spaces
	Day Use Facility	Faucherie	Faucherie	Faucherie Day Use and Parking	14 spaces (shared with boat launch)

* Site capacities will change as Project development plans are implemented. Use current available capacity at time of survey.

Table 3. YB facilities - New facilities to be constructed when implementation triggers are met.

Licensee	Recreation Area	Reservoir	Facility Group Hitting Trigger	Facility to be constructed when trigger is reached:
NID	Jackson Meadows	Jackson Meadows	East Meadow CG Pass Creek CG Findley CG Fir Top CG Woodcamp CG 20 additional sites	Additional campsites at Jackson Meadows Reservoir (either NFS or NID lands)
	Jackson meadows	Jackson Meadows	Aspen Group CG Silvertip Group CG 50 Additional PAOT	Additional at Jackson Meadows Reservoir (either NFS or NID lands) 50 PAOT
	Canyon Creek	Sawmill Faucherie	Sawmill Group CG (proposed)	Bowman Group CG ¹ on NID lands.

¹ TNF recommends developing Bowman Group Campground concurrently with the conversion of the Bowman area from dispersed to developed (and the Bowman Family campground rehabilitation) in lieu of converting the dispersed sites in this same area into a small single family campground.

Appendix I-2

Bureau of Land Management 4(e) Conditions: Yuba-Bear Project

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U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF LAND MANAGEMENT'S PRELIMINARY
COMMENTS, SECTION 4(e) CONDITIONS, AND 10(a)
RECOMMENDATIONS
FOR THE BENEFICIAL USE OF BLM LANDS IN AND AROUND THE
YUBA-BEAR PROJECT,
FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 2266-102

V. PRELIMINARY RECOMMENDATIONS, TERMS AND CONDITIONS FOR THE YUBA-BEAR PROJECT

The B L M through its preliminary recommendations, terms and conditions and prescriptions seeks to ensure appropriate levels of resource protection are incorporated in any new license. The BLM recommends that the FERC include in any new license issued for the YB Project the following BLM preliminary recommendations, terms and conditions. The B L M believes that the resource measures presented in this section adequately address impacts to the ecological and cultural resources impacted by the YB Project.

PROPOSED LICENSE ARTICLES FOR THE YUBA-BEAR PROJECT, FERC NO. 2266-096

These Proposed License Articles are submitted to FERC as 4(e) Conditions (both specific and general/administrative) and 10(a) Recommendations.

a. Preliminary 4(e) Conditions

Condition 1 – Annual Employee Training

Licensee shall, beginning in the first full calendar year after license issuance, annually perform employee awareness training. The goal of the training shall be to familiarize Licensee's operations and maintenance (O&M) staff with special-status species, non-native invasive plants, and sensitive areas (e.g. special-status plant populations and non-native invasive plant locations) that are known to occur within or adjacent to the FERC Project Boundary on BLM land, and procedures for reporting to BLM , and BLM orders as appropriate. Licensee shall provide to each O&M staff a confidential map showing these sensitive areas including GPS coordinates, as well as pictures and other guides to assist staff in recognizing special-status species and non-native invasive plants. It is not the intent of this measure that Licensee's O&M staff performs surveys or become specialists in the identification of special-status species or noxious weeds. Licensee shall direct its O&M staff to avoid disturbance to sensitive areas, and to advise all Licensee contractors to avoid sensitive areas. If Licensee determines that disturbance of a sensitive area is unavoidable, License shall consult with BLM if the disturbance may occur to public land administered by BLM prior to any ground disturbing activities in the sensitive area to minimize adverse effects to sensitive resources.

Condition 2 - Coordinated Operations Plan

Licensee shall, within 90 days after issuance of new licenses for the Yuba-Bear Hydroelectric Project or Drum-Spaulding Project, whichever is later, file with the Commission for approval a Coordinated Operations Plan (Plan). Licensee shall develop the Plan in consultation with the licensee for the (Drum-Spaulding Hydroelectric Project). The purpose of the Plan shall be to provide for coordination between the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project regarding implementation of flow-related measures in each Project's License. Licensee shall file the Plan, with evidence of consultation as the Plan relates to compliance with flow-related measures, with FS, BLM, CDFG, and State Water Board, and Licensee of the Drum-Spaulding Project, with the Commission. Licensee shall implement those portions of the Plan approved by the Commission.

Condition 3 – Water Year Types

Within 90 days of license issuance, Licensee shall in each year in each of the months of February, March, April, May and October determine water year type as described in Table 1 of this measure. Licensee shall use this determination in implementing articles and conditions of the license that are dependent on water year type. Water year types shall be defined as:

Condition 3 - Water Year Types

Table 1. Water Year types for the Yuba-Bear Project.

Water Year Type	DWR Forecast of Total Unimpaired Runoff in the Yuba River at Smartville in Thousand Acre-Feet or DWR Full Natural Flow Near Smartville for the Water Year in Thousand Acre-Feet ¹
Extreme Critically Dry	Equal to or Less than 615 or 2nd year of a back-to-back Critically Dry Water Years (<=900)²
Critically Dry	616 to 900
Dry	901 to 1,460
Below Normal	1,461 to 2,190
Above Normal	2,191 to 3,240
Wet	Greater than 3,240
¹ DWR rounds the Bulletin 120 forecast to the nearest 1,000 acre-feet. The Full Natural Flow is provided to the nearest acre-foot, and Licensee will round DWR's Full Natural Flow to the nearest 1,000 acre-feet.	
² Applies only to minimum instream flows in the Bear River below Rollins Reservoir.	

In each of the months of February, March, April and May, the water year type shall be based on California Department of Water Resources (DWR) water year forecast of unimpaired runoff in the Yuba River at Smartville as set forth in DWR's Bulletin 120 entitled "*Water Year Conditions in California*." DWR's forecast published in February, March and April shall apply from the 15th day of that month to the 14th day of the next month. From May 15 through October 14, the water year type shall be based on DWR's forecast published in May.

From October 15 through February 14 of the following year, the water year type shall be based on the sum of DWR's monthly (not daily) full natural flow for the full water year for the Yuba

River near Smartville as made available by DWR on the California Data Exchange Center (CDEC) in the folder named “FNF Sum.” (Currently these data are available at: <http://cdec.water.ca.gov/cgiprogs/stages/FNFSUM>). If DWR does not make the full natural flow for the full water year available until after October 14 but prior to or on October 31, from 3 days after the date the full natural flow is made available until February 14 of the following year, the water year type shall be based on the sum of DWR’s monthly full natural flow for the full water year as made available. If DWR does not make available the final full natural flow by October 31, the water year type from November 1 through February 14 of the following year shall be based on DWR’s May Bulletin 120.

Condition 4 – Minimum Streamflows

Licensee shall meet the Minimum Streamflows shown in Table 2 of this measure.

Minimum Streamflows in this part of the measure shall mean the instantaneous flow except as otherwise provided below, and Licensee shall record instantaneous streamflow at all gages as required by USGS (Article 8 of FERC’s Form L-5, Standard Articles):

- Minimum Streamflows may be temporarily modified for short periods upon consultation with CDFG, SWRCB, FS, and BLM and approval by SWRCB and FS or BLM, as applicable, and notification to FERC.
- Minimum Streamflows may be temporarily modified due to an emergency. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. If the Minimum Streamflows are so modified, Licensee shall notify FERC, CDFG, SWRCB, FS, and BLM as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after such modification.

Except as otherwise provided, Licensee shall implement Minimum Streamflows shown in Table 2 of the measure within 90 days of license issuance unless a facility modification or construction is necessary. Where a facility must be modified or constructed to allow compliance with the required Minimum Streamflows, including flow measurement facilities, except as otherwise provided, Licensee shall submit applications for permits to modify or construct the facility as soon as reasonably practicable but no later than 2 years after license issuance and will complete the work as soon as reasonably practicable but no later than 2 years after receiving all required permits and approvals for the work. During the period before facility modifications or construction are completed, and starting within 90 days after license issuance, Licensee shall make a good faith effort to provide the specified Minimum Streamflows within the reasonable capabilities of the existing facilities.

Table 2. Minimum Streamflows¹ in cubic feet per second (cfs) for the Yuba-Bear Hydroelectric Project by month and Water Year Type as described in Part 1 of this measure.

Month	Extreme Dry Water Year	Critically Dry Water Year	Dry Water Year	Below Normal Water Year	Above Normal Water Year	Wet Water Year
BEAR RIVER - BELOW DUTCH FLAT AFTERBAD DAM¹⁶ (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11421790)						
October	7	7	8	10	13	13
November	7	7	8	10	13	13
December	7	7	8	10	13	13
January	7	7	8	10	13	13
February	10	10	15	20	22	30
March	15	15	20	25	30	40
April	20	20	25	30	35	45
May	15	15	20	25	30	40
June	10	10	15	20	22	30
July	10	10	10	10	12	15
August	10	10	10	10	12	15
September	10	10	10	10	12	15
16 Refer to Condition No.4 regarding Minimum Streamflows during Drum-Spaulding Project Drum Canal outages.						
BEAR RIVER - BELOW CHICAGO PARK POWERHOUSE¹⁵						
There is no Minimum Streamflow release requirement from Chicago Park Powerhouse.						
15 Refer to Condition No.5 regarding motoring of the Chicago Park Powerhouse.						
BEAR RIVER - BELOW ROLLINS DAM^{16, 172} (COMPLIANCE POINT: USGS STREAMFLOW GAGE 11422500)						
October	20	40	40	55	65	65
November	15	20	23	30	40	50
December	15	20	23	30	40	50
January	15	20	23	30	40	50
February	15	20	23	30	40	50
March	15	20	25	30	40	50
April	15	40	40	50	75	75
May	20	45	45	65	100	100
June	20	50	50	65	125	125
July	20	50	50	70	109	125
August	20	50	50	70	109	125
September	20	50	50	70	80	80
16 Refer to Condition No. 6 regarding Rollins Dam spill cessation schedule.						
17 Refer to Condition No. 7 regarding Rollins Reservoir operations control.						

Bear River Below Dutch Flat Afterbay Dam (Yuba-Bear Hydroelectric Project)

Condition 5 – Canal Outages

This part of the measure pertains to outages of the Project’s Bowman-Spaulding Diversion Conduit and outages of the Drum-Spaulding Project’s Drum Canal that affect Minimum Streamflows described in Part 2 of this measure. For the purpose of this part of the measure, there are three types of canal outages: 1) annual planned outages; 2) non-routine planned outages; and 3) emergency outages. For the purpose of this part: an “annual planned outage” is defined as an outage that is typically taken around the same time each year for routine maintenance; a “non-routine planned outage” is defined as an outage for work that is high

priority work (often major maintenance) and performed under planned conditions but is not performed during the annual planned outage period; and an “emergency outage” is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents.

Drum-Spaulding Project’s Drum Canal

During the annual meeting (Condition No.43) Licensee shall inform meeting participants about annual planned outages of the Drum Spaulding Project’s Drum Canal, including the anticipated time-frame that the annual planned outages will occur, and any non-routine planned outages that are already planned at the time of the annual meeting for the upcoming year. Annual planned outages of the Drum-Spaulding Project’s Drum Canal are normally, but not always, taken for approximately a 2-week period sometime between [late September and early October \(Drum Canal\)](#) or late March to early April (South Yuba Canal) Licensee shall in good faith provide FS, BLM, CDFG and SWRCB as much notice as is reasonably possible for any annual planned outages or non-routine planned outages of the conduit that were not noted in the annual meeting or that become anticipated to occur at a time that is different than reported in the annual meeting. For all annual planned outages and non-routine planned outages, Licensee shall comply with the Canal Fish Rescue Plan (Condition No.11) as well as all applicable laws and permitting requirements. Licensee shall provide FS, BLM, CDFG and SWRCB notice by electronic mail as soon as reasonably possible, but no later than the end of the next business day (business days do not include weekends and federal or state holidays) after an emergency outage occurs.

During outages of the Drum Spaulding Project’s Drum Canal, which is upstream of Dutch Flat Afterbay Dam, Licensee shall adhere to the Minimum Streamflow below Dutch Flat Afterbay Dam until Dutch Flat Afterbay reaches an elevation of 2,700 feet, after which the minimum streamflow below Dutch Flat Afterbay Dam during the Drum Canal outage shall be outflow equals inflow.

Condition 6 – Chicago Park Powerhouse Motoring

Licensee shall, from May 1 through September 15 of each year, make a good faith effort to avoid non-routine planned outages and operate the turbine/generator unit in Chicago Park Powerhouse in a synchronous condense mode when the unit is not generating electricity (i.e., "motor" the unit). If from May 1 through September 15 Licensee shuts down the Chicago Park Powerhouse for a non-routine planned outage which would cause the Dutch Flat Afterbay to spill, Licensee shall make a good faith effort to motor the powerhouse until the flows from the Dutch Flat Afterbay, consistent with Part 7 of this measure (i.e., regarding spill cessation at Dutch Flat Afterbay Dam), reach the tailrace of the Chicago Park Powerhouse.

Condition 7 – Spill Cessation Measures

This part pertains to spill cessation and operations at Bear River below Dutch Flat Afterbay Dam.

Licensee shall make a good faith effort to provide the target flows, measured as mean daily flow, within 10 percent of the target flows shown in Tables 6, 7 of this measure. However, it is recognized that some conditions (e.g., storm conditions) may result in flows outside Licensee's ability to control. The target flows are targets only, and as long as Licensee shall make a good faith effort to meet the target flows, failure to meet the target flows shall not be considered a violation of this part of the measure. The requirements in this part are not subject to a ramping rate. Licensee shall make available to SWRCB, CDFG, FS, and B L M the streamflow records related to the spill cessation schedules upon request.

The dam spill cessation schedule requirements in this part are subject to temporary modification if required by equipment malfunction, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an outage due to an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents. If Licensee temporarily modifies the requirements of this condition, Licensee shall make all reasonable efforts to promptly resume performance of the requirements and shall notify BLM, FS, SWRCB, and CDFG within 48 hours of the modification.

Licensee shall commence the dam spill cessation schedules in this part within 90 days of license issuance unless a facility modification or construction is required. Where a facility must be modified or constructed to allow compliance with the required spill cessation schedule, including flow measurement facilities, except as otherwise provided, Licensee shall submit applications for permits to modify or construct the facilities as soon as reasonably practicable but no later than 2 years after license issuance and will complete the work as soon as reasonably practicable but no later than 2 years after receiving all required permits and approvals for the work. During the period before facility modifications or construction are completed, and starting within 90 days after license issuance, Licensee shall make a good faith effort to provide the specified spill cessation schedules within the reasonable capabilities of the existing facilities.

Dutch Flat Afterbay Dam

License shall adhere to the Dutch Flat Afterbay Dam spill cessation schedules described in Table 6 (for spills of 3 days or less) and Table 7 (for spills of more than 3 days) between May 1 and September 30 when the Chicago Park Flume and/or Powerhouse are out of service due to either planned or unplanned/emergency outage or Licensee has restricted the capacity of the Chicago Park Flume such that it results in spilling of the Dutch Flat Afterbay. During a Chicago Park Flume and/or Powerhouse outage that results in spilling of the Dutch Flat Afterbay, Licensee shall establish a draft of between 50 and 100 cfs from the Dutch Flat Afterbay Dam low-level outlet as high as possible depending on available water to maintain the Dutch Flat

Afterbay level at or above 2,732 feet elevation, below which cavitation could cause unit reliability issues with Dutch Flat No. 2 Powerhouse. The spill cessation schedules in Table 6 and Table 7 shall begin when the Chicago Park Flume and/or Powerhouse is brought back on-line and the Dutch Flat Afterbay ceases spilling, as observed at the ogee-crest spillway at Dutch Flat Afterbay, and shall continue until the Minimum Streamflow Flow for that Water Year Type and month as shown in Table 1 of this measure is reached.

Table 6. Spill cessation schedule in the Bear River downstream of Dutch Flat Afterbay Dam for spills at Dutch Flat Afterbay lasting 3 days or less.

If the peak of the licensee-caused spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of spill flow is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the spill cessation schedule continuing until Target Flows are 25 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11421790
1 day	75 cfs
1 day	50 cfs
1 day	25 cfs

Table 7. Spill cessation schedule in the Bear River downstream of Dutch Flat Afterbay Dam for Licensee-caused spills at Dutch Flat Afterbay lasting longer than 3 days.

If the peak of the Licensee-caused spill is greater or equal to the highest flow on the spill cessation schedule, then the spill flows will be decreased according to this schedule. If the peak of the Licensee-caused spill is less than the highest flow on the schedule, then the spill flows will be decreased according to the schedule from the observed flow downward. While the table shows the Licensee-caused spill cessation schedule continuing until Target Flows are 25 cfs, each spill cessation event will stop when the Target Flow shown in the table is equal to or less than the applicable Minimum Streamflow shown in Part 2 of this measure; that is, the spill cessation event will end at the applicable Minimum Streamflow.

Target Number of Days to Hold Target Flow	Target Mean Daily Flow in cfs at USGS Streamflow Gage Station 11421790
*7 days	75 cfs
7 days	50 cfs
7 days	25 cfs

Condition 8 – Rollins Reservoir Elevation Control

Licensee shall make a good faith effort to manage the flows in the Bear River below Rollins Dam in a manner so as to match outflows with inflows when Rollins Reservoir elevation is within the top 2 to 3 feet (2,168.00 feet to 2,171.00 feet) of the reservoir. The goal of this measure is to eliminate rapid fluctuations in the Bear River below Rollins Dam. To the extent possible, Licensee shall manage the reservoir elevation within the top 2 to 3 feet of the reservoir by adjusting the draft out of reservoir into the Bear River based on inflows to Rollins Reservoir that are above downstream water supply demand. The adjustments shall be done over a period of time so as to have the draft at maximum when Rollins Dam begins spilling. After May 1 of each

calendar year, when Rollins Reservoir inflows begin to subside and Rollins Dam stops spilling, Licensee shall manage the reduction in draft in a manner so as to keep Rollins Reservoir in the top 2 to 3 foot band while also managing flow releases below Rollins Dam so that the stage (water depth) does not decrease more than 1 foot total during any 3-week period (measured at USGS gage 11422500).

The requirements of this measure are subject to temporary modification if required by equipment malfunction, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an event that is reasonably out of the control of Licensee and requires Licensee to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, or other regulatory agency staff, including actions to prevent the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; vandalism; malfunction or failure of Project works; or other public safety incidents.

Condition 9 – Rollins Dam Large Woody Material Management

Licensee shall, in October of each year, relocate the large woody material that has accumulated on the upstream side of Rollins Dam spillway log boom to the downstream side of the log boom. Licensee shall allow the large woody material between the log boom and spillway to pass over the spillway when the reservoir spills. This measure does not require that Licensee gather large woody material and deposit it near the log boom, or modify Rollins Reservoir operations to facilitate the passage of large woody material over the spillway.

Licensee shall survey LWM in the approximately 10-mile reach of the Bear River downstream of Rollins Dam to Lake Combie during the 5th year after license issuance and report the findings to CDFG, BLM, SWRCB, and FS. If there are less than an average of 2.4 pieces of stable LWM per 100 meters, Licensee shall “anchor” large woody material using a method approved by CDFG and BLM to ensure that at least 2 stable pieces of the size described below occur in each 100 meters. “Stable” LWM is defined as either longer than the channel width or buried at one or both ends. LWM for anchoring purposes is defined as greater than 4.6 m long and greater than 30 cm in diameter.

Subsequently, LWM monitoring - and anchoring if necessary - shall continue once every 5 years throughout the license, and the results shall be reported to CDFG, BLM, SWRCB, and FS both in writing and in the annual meetings.

Condition 10 – Steephollow Creek Foothill Yellow-Legged Frog Monitoring

In order to reduce the likelihood and frequency of large magnitude spills into Steephollow Creek, Licensee shall, within one year of license issuance, implement the following:

- Licensee shall set controls to continuously monitor Chicago Park Forebay elevation so as to automatically put the unit into “Float Load Control” at an elevation just below spill elevation to increase the unit load to prevent forebay spill.
- In an effort to shorten the time the Chicago Park conduit is in service after the relay, Licensee

shall install a feature that would automatically close the conduit intake at Dutch Flat Afterbay upon a relay of the Chicago Park Unit.

During the course of the new license, the Licensee may, with BLM's concurrence, implement new technologies to more efficiently prevent spills at Chicago Park Forebay.

Licensee shall, beginning in the first full calendar year after license issuance, monitor foothill-yellow-legged frogs (FYLF) in Steephollow Creek from the confluence with the Bear River for a distance of 1,000 meters upstream. The purpose of the monitoring is to assess if spills from the Chicago Park Conduit result in adverse effects on the FYLF population in Steephollow Creek and, if necessary, to facilitate the development of mitigation measures. Baseline monitoring shall occur in the first full calendar year following license issuance and be repeated in the second and third full calendar years following license issuance.

Event-based monitoring shall occur beginning the second full calendar year after a spill event and will be repeated in the third year following that spill event. When the results of the two years of monitoring are known, Licensee shall consult with BLM, CDFG, and State Water Board as to the need for a third year of monitoring. A Chicago Park Conduit spill event that requires monitoring is defined as:

- A spill of more than 100 cfs between April 1 and June 15; or
- A spill of more than 300 cfs between June 16 and September 15

Licensee shall notify BLM, CDFG, and State Water Board within two business days of any spill event occurring between April 1 and September 15. Spill events between September 16 and March 31 do not qualify as spill events that require monitoring.

FYLF monitoring shall occur for 1,000 meters of Steephollow Creek (i.e., beginning at the confluence with the Bear River) and will consist of a tally of each FYLF life stage detection, recording locations of egg masses with a hand held global positioning system (GPS) device, and photo-documenting Baseline monitoring and event based monitoring will be comprised of four surveys: the first two in spring (typically May) focusing on adults and egg masses, the third at least one month later focusing on tadpoles, and the fourth in late summer/fall focusing on metamorphosed juveniles. Licensee's methods shall follow the methods for visual encounter surveys and data analysis described in Licensee's relicensing 2011 Special-Status Amphibians – Foothill Yellow-Legged Frog Surveys Technical Memorandum (Appendix E12 in Exhibit E of Licensee's April 2011 Final License Application), except that collection of habitat data for FYLF detections will not be necessary.

In years in which monitoring occurs, Licensee shall prepare a report summarizing the monitoring. The report shall include the results of the monitoring, including a description of the spill event (i.e., flow, duration and reason for spill event) if the monitoring was triggered by a spill event, and shall compare the conditions in the creek to those conditions in the creek documented by past monitoring. The report shall include any Licensee recommendations to mitigate observed adverse effects. The report shall be provided to BLM, CDFG, and State Water Board by December 31 and shall be discussed at the annual consultation meeting.

If BLM determines that substantial adverse environmental impacts are occurring as a result of such spills, Licensee shall develop and shall implement, in consultation with and upon approval of BLM, effective mitigation measures, up to and including upgrading the facilities to prevent such spill events, to mitigate such impacts.

Condition 11 – Canal Outages Fish Rescue Plan

A Canal Outages Fish Rescue Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with the FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for, BLM, approval. Once the plan is complete, it will be included as part of this condition.

Condition 12 – Ecological Group

Licensee shall, within 3 months of license issuance, in coordination with FS, BLM, CDFG, State Water Board, and other interested stakeholders, establish an Ecological Group for the purpose of assisting Licensee in the project-wide implementation of monitoring plans, and review and evaluation of monitoring data Licensee shall provide to FS, BLM, CDFG, State Water Board, interested stakeholders, and the Commission by June 30 of each year an annual report of the activities of the Ecological Group

Condition 13 – Gaging Plan

A Gaging Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with the FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for, BLM approval. Once the plan is complete, it will be included as part of this condition.

Condition 14 – Modifications of 4(e) Conditions in the Event of Anadromous Fish Re-introduction

The B L M, as appropriate, reserves the right to modify these conditions to respond to any reintroduction of Chinook salmon or steelhead trout listed under the Endangered Species Act to stream reaches through BLM lands where the flow is controlled by this Commission licensed facility.

Condition 15 –Aquatic Invasive Species Management

The Licensee shall, within 1 year after license issuance, file with FERC a plan approved by BLM, , to address invasive species such as the New Zealand mudsnail (*Potamopyrgus antipodarum*), Quagga mussels (*Dreissena bugensis*), and zebra mussels (*Dreissena polymorpha*) if they are found during any monitoring.

Invasive algae (*Didymosphenia geminata*) was found throughout the Project area. If future studies document a safe method of reducing this invasive alga in rivers, the Licensee may be asked to implement this task in Project-related locations.

Licensee shall implement the following AIS Best Management Practices (BMP) for invasive aquatic species prevention within the FERC Project Boundary at Project reservoirs:

- Licensee will implement a public education program, including signage and information pamphlets at public boat access sites, covering the following prevention actions:
 - Draining water from boat, motor, bilge, live well and bait containers before leaving a water access site.
 - Removing visible plants, animals and mud from boat before leaving waterbody.
 - Cleaning and drying boats using California Department of Fish and Game (CDFG) accepted protocols for the prevention of all AIS before entering any waterbody area
 - Disposing of unwanted bait in trash, including earthworms.
 - Avoiding the release of plants and animals into a waterbody unless they already came from that waterbody.
- If any reservoir access sites become infested with AIS, Licensee will consult with appropriate agencies, institute appropriate signage, implement access restrictions and/or inspection and cleaning stations.
- In accordance with Assembly Bill 2065, Project reservoirs will be assessed for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels) and if necessary, further actions to prevent their introduction will be designed and implemented.

Condition 16 – Terrestrial Protection Measures

Vegetation and Non-Native Invasive Plant Management Plan

Within one year of license issuance, the Licensee shall complete, in consultation with FS, BLM, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, and approved by BLM, a single Vegetation and Non-Native Invasive Plant Management (NNIP) Management Plan (Plan) for all BLM administered lands potentially affected by the Project. Targeted NNIP will be those species defined by the California Department of Food and Agriculture (CDFA) code, the California Invasive Plant Council (Cal-IPC) rating system, or as BLM species of concern.

The Plan will address Special Status species, terrestrial NNIP species, and revegetation within the Project boundary and adjacent to Project features directly affecting BLM lands including Project and project related roads, facilities, and distribution and transmission lines. Minimum components of the Plan include, but may not be limited to:

- Special status species management: protection, monitoring, frequency of surveys, internal education, reporting, and adaptive management.
- Sensitive area protection, including guidelines for conducting activities that reduce the effects to sensitive resources.
- Non-native invasive plant (NNIP) species management: frequency of surveys, guidelines for prevention, treatment, internal education, monitoring, reporting, guidelines for conducting weed risk assessment for new project feature development, including an

adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.

- Methods that ensure early detection and treatment of NNIP.
- Guidelines for treatment of NNIP populations on Federal lands within the FERC Project boundary. In areas where NNIP populations that are determined to be project-related extend outside the FERC Project boundary, treatments would extend up to 1% mile beyond the FERC Project boundary. If noxious weed populations extend more than 1% mile from the FERC Project Boundary, and are determined to be Project-related, Licensee will consult with FS or BLM to determine if the populations should be treated and, if so, the appropriate treatment methods. The same treatments are recommended on Licensee lands.
- Guidelines for conducting Licensee's inspections of equipment and vehicle for NNIPs.
- List of target NNIPs agreed to and approved by BLM.
- Revegetation implementation and monitoring.
- Treatment protocols for vegetation management, hazardous fuels reduction, and hazard tree management for protection of Project facilities and Project-affected resources within the Project affected area.
- Pesticide/herbicide use approval and restrictions.
- Habitat management for specific special-status wildlife species.
- Annual reporting guidelines for the annual consultation meeting.

The Licensee, in consultation with BLM, will review, update, and/or revise the Plan if substantial changes in vegetation management occur. Changes may be implemented if monitoring feedback indicates that resource objectives are not being met.

Any updates to the Plan would be prepared in coordination and consultation with FS and BLM. A minimum of 60 days would be allowed for FS and BLM to comment and make recommendations before Licensee files the updated plan with the Commission. Any changes to the Plan shall be approved by FS and BLM. Licensee would include all relevant documentation of coordination/consultation with the updated Plan filed with the Commission.

Condition 17 – Monitor Animal Losses in Project Canals

Beginning in the first full calendar year after license issuance, Licensee shall record animal losses in all Project canals. Specifically, Licensee's operators shall record in log books all dead animals observed on canal trash racks and otherwise in the canals using the Wildlife Mortality data sheets found in Appendix 4-2A of the Wildlife Movement Technical Memorandum (4-2) included in Appendix E12 of Licensee's application for new license. Licensee shall make a good faith effort to record the location of the dead animal (i.e. which Project canal, where in the canal the dead animal was found, and the associated structure), species, date and time of the observation, suspected cause of death if it can be determined from visual observation only, photograph if available, estimated size, estimated age, and sex if known, and other pertinent information. The information will include the cumulative years and preceding year's mortality by canal segment, and a map showing segments (defined by location of trash racks). Licensee shall provide this information to CDFG, FS, and BLM at least 60 days prior to the annual consultation meeting described in Condition No. 43.

Licensee shall consult with FS, BLM, and CDFG and other interested parties during the annual consultation meeting, regarding the protection and utilization of the wildlife resources affected by the Project. If there is an increasing trend in animal mortalities in a canal, additional measures to address suspected Project-related causes for that canal may be developed by Licensee in consultation with CDFG, FS, and BLM.

Condition 18 – Replacement of Wildlife Escape and Wildlife Crossing Facilities

Prior to replacing or retrofitting existing wildlife escape facilities and wildlife crossings along Project canals, Licensee shall consult with CDFG regarding specifications and design and with FS or BLM, as appropriate. Licensee shall file the design, including evidence of consultation, with the Commission within 60 days after the wildlife escape facility or wildlife crossing facility has been replaced or retrofitted. Licensee shall also assess existing wildlife escape facilities and wildlife crossing facilities annually to ensure they are functional and in proper working order. Inspections shall occur at the same time other types of maintenance activities or canal assessments are being conducted.

Condition 19 – Bald Eagle Management Plan

A Bald Eagle Management Plan was provided in the Final License Application Amendment. The Licensee will, in consultation with the FS, BLM, CDFG, and State Water Board, finalize the plan provided in the Final License Application and submit for FS, BLM, CDFG, and State Water Board approval. Once the plan is complete, it will be included as part of this condition.

Condition 20 – Special Status Species

Before taking actions to construct new project features on BLM lands that may affect BLM special status species or their critical habitat on BLM land, the Licensee shall prepare and submit a biological evaluation (BE) for BLM, as appropriate, approval. The BE shall evaluate the potential impact of the action on the species or its habitat. The BLM may require mitigation measures for the protection of the affected species on BLM lands may require mitigation measures for the protection of the affected species on BLM administered land.

The biological evaluation shall:

- Include procedures to minimize or avoid adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition 21 – Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land

Licensee shall, beginning the first full calendar year after license issuance, in consultation with BLM, annually review the current list of special-status plant and wildlife species (species that

on BLM's Sensitive list that might occur on public land administered by BLM in the Project area) that may be directly affected by Project operations. When a species is added to one or more of the lists, Licensee, in consultation with BLM shall determine if the species or un-surveyed suitable habitat for the species is likely to occur on public land administered by BLM. For such newly added species, if BLM determines that the species is likely on such public land administered by BLM, as appropriate, in the Project area that may be directly affected by the Project, Licensee shall develop and implement a study plan in consultation with BLM, as appropriate, to reasonably assess the effects of the project on the species. Licensee shall prepare a report on the study, including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to BLM for review and approval. Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

Condition 22 – Bat Management

In the first full calendar year after license issuance, Licensee shall document all known bat roosts within Project buildings (e.g., powerhouses, storage buildings, valve houses), dams, or other structures that may be used as a roosting structure. The results of the inspection will be provided to CDFG, and to FS or BLM if the facility is located on BLM lands, at least 90 days prior to the annual consultation meeting (described in Condition No.41) that follows collection of the information. If bats or signs of roosting are present where staff have a routine presence (i.e., at least daily or weekly), Licensee will attempt, where feasible, and in the calendar year following the annual consultation meeting described above, to place humane exclusion devices to prevent occupation of the structure by bats. Humane exclusion devices will be placed when bats are absent from the facility, generally between November 1 and February 28. Prior to installation of the humane exclusion devices, Licensee shall perform an inspection of the facility to ensure that overwintering bats are not trapped. If overwintering bats are present during the inspection, installation of humane exclusion measures shall be delayed. Licensee shall notify CDFG and BLM of the overwintering bats. Licensee shall consult with the CDFG, FS, or BLM during the annual consultation meeting described in Condition 43 to identify future dates that would be suitable for installation of humane exclusion devices. All exclusion devices will be inspected on an annual basis and the facility will be reevaluated for roosting bats every 3 years after the initial exclusion devices are installed to insure that no new roosts or entry points have been established.

Condition 23 – Monitoring Program

The Licensee shall implement the following Monitoring Program after license issuance and through the term of the new license and any annual licenses, in coordination with FS, BLM, CDFG, and State Water Board. The Monitoring Program has been designed to monitor those items that are considered to be essential for determining if the resource objectives described in the Rationale Report are being met. Within the scope of the specified monitoring program, FS, BLM, CDFG, and State Water Board may select an equal number of alternative years to ensure that surveys occur during a range of water year types. Final study plans for each element of the Monitoring Program shall be approved by FS, BLM, CDFG, and State Water

Board prior to implementation of the program. FS, CDFG, BLM, and State Water Board have the flexibility to alter the monitoring program methodologies and frequencies of data collection if it is determined that: (a) there is a more appropriate or preferable methodology or site to use than that described in the monitoring plan or (b) monitoring may be reduced or terminated because the relevant ecological resource objective has been met or no change in resource response is expected.

The Licensee shall file with the Commission by June 30 of each year an Annual Report fully describing the monitoring efforts of the previous calendar year as well as a report documenting all deviations from the license conditions. FS, CDFG, BLM, and State Water Board shall have at least 30 days to review and comment on the draft report prior to filing with the Commission. Comments shall be addressed in the final report, or as appropriate, comments shall be included with the filing to Commission. The Licensee shall provide copies of the annual report to FS, CDFG, BLM, and State Water Board. Every 5 years, the Licensee shall provide a summary report of the monitoring results of the previous 5-year period, including any recommendations to address monitoring results, and provide to FS, CDFG, BLM, and State Water Board.

The following guidelines shall be used in implementing the monitoring program: (a) monitoring and studies shall be relevant to the Project, (b) monitoring and studies shall be conducted such that they provide useful information for management decisions or establishing compliance with license conditions, and (c) monitoring and studies shall be as cost-effective as possible. Funding for performing the monitoring, as well as specified contingency funding, shall be provided by the Licensee.

For purposes of the Monitoring Program, each year is defined on a calendar year basis (i.e., January through December). This monitoring program covers monitoring to be conducted during all years until a new license is issued. Most monitoring described below is estimated to end after 30 years; however, if a new license is not issued within 30 years, FS, BLM, CDFG, and/or State Water Board reserve the right to extend the monitoring period as necessary.

The following is an overview of the aquatic monitoring program.

Large Stream and Riverine Aquatic Species

Streamflow conditions throughout the DS project will change as a result of the new license. Aquatic species may respond either positively or negatively to changes in timing, magnitude, and duration of streamflows. These streamflow changes will also lead to water temperature changes. Monitoring of aquatic species is proposed to allow assessment of their responses to streamflows and water temperatures and to take appropriate management actions as necessary.

Reaches

Large stream reaches include South Yuba River, Bear River, North Fork of the North Fork of the American, and Canyon Creek (below Towle Canal).

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on the distribution and abundance of special status, native, and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions. The following are focal species/species groups.

- rainbow trout (RBT) and other native fish species of interest
- foothill yellow-legged frogs (FYLF)
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)
- aquatic invasive species (e.g., *Didymosphenia geminata*)

Number of Sites and Frequency of Monitoring

Monitor one to four survey sites (depending on reach length and configuration) within each stream reach that each species or species group is currently known to occur (based on relicensing studies and other recent survey records) (Table 1). For FYLF and RBT, periodically expand the survey area for the most upstream and/or most downstream sites in each reach to determine if the distributions of these species are shifting over the course of the license (Tables 1 and 2).

A combination of annual and periodic monitoring is proposed. Generally, a higher frequency of monitoring shall be done immediately following license implementation, lower frequency in the middle of the license period, and higher frequency again immediately prior to the filing of the NOI/PAD for the next relicensing (Table 2). For FYLF, RBT, and BMI conduct annual surveys on a subset of sites for the first 10 years following implementation of new license conditions. After 10 years, Licensees will consult with resource agencies to determine if annual monitoring should continue.

Distribution and Population Metrics

Sampling effort should be sufficient to derive quantitative, repeatable, and reliable metrics of the lifestage periodicity/phenology, distribution, relative abundance, and condition (as appropriate) of each species/species group within each reach and throughout the project- affected area.

Example lifestage periodicity metrics:

- date range of FYLF breeding/egg mass deposition
- date range of RBT and other fish spawning and fry emergence

Example distribution metrics:

- # or proportion of sites occupied within stream reach
- # or proportion of sites occupied throughout all reaches

Example relative abundance metrics:

- # of FYLF egg masses per mile (or kilometer)
- # of FYLF by lifestage, stream distance or area surveyed
- # of WPT per survey time
- # of RBT by lifestage, per mile

Example condition metrics:

- RBT/other fish pounds per acre
- BMI diversity, biomass, sensitivity metrics

Special Purpose Monitoring

Conduct quantitative monitoring of fish populations in key large river reaches following extreme critical dry years.

Smaller Upper Elevation Streams – Aquatic Species

Species to Monitor

Collect data that will allow quantitative assessment of the effects of new license conditions on special status and other species of interest (e.g. sportfish) in conjunction with key environmental and ecological conditions.

Focal species:

- rainbow trout (RBT) and other fish species of interest
- western pond turtles (WPT)
- aquatic benthic macroinvertebrates (BMI)

Number of Sites and Frequency of Monitoring

Monitor small streams on a rotating basis every five to ten years.

Habitat and Environmental Conditions

Streamflow conditions throughout the DSYB projects will change as a result of the new license. These streamflow changes will also lead to water temperature changes.

Monitoring of streamflow and water temperature is proposed to document compliance with minimum instream flow conditions and ramping/spill recession rates and to allow assessment of aquatic species responses to streamflows and water temperatures. Monitoring of geomorphology, riparian, stream substrate and woody material conditions are proposed to

Habitat and Environmental Conditions to Monitor

- streamflow/discharge (cfs) and stage monitoring
- water temperature
- channel morphology/riparian condition
- stream substrate and woody material conditions
- water quality and mercury bioaccumulation

Number of Sites and Frequency of Monitoring

- Streamflow/stage change and water temperature - Distribute data collection sites for streamflow and water temperature so that they will inform aquatic species monitoring. Collect 15 min and/or daily data each year. Provide real-time data for reaches/locations of interest (to be determined).
- Channel morphology/riparian, water quality/mercury bioaccumulation, stream substrate/woody material conditions – Conduct periodic monitoring of these habitat elements in reaches/locations of interest. For channel morphology and woody material, key reaches include: Bear River reach #2 (meadow and below Boardman Canal), Bear River below Rollins Reservoir and Bear River Diversion Dam, Middle Yuba below Milton, North Fork of the North Fork American, Meadow Lake, Clear and Trap Creeks (related to channel stabilization plan).

Reporting

Summarize aquatic species monitoring data in annual monitoring reports that include, at a minimum, information on survey effort and timing, maps of species distributions, quantitative descriptions of species' distribution and relative abundance, and relationships (via graphing and other analyses) of species distribution/abundance to streamflow and water temperature conditions. Provide data to agencies and other interested parties electronically in spreadsheets (e.g., Excel) and spatial formats (e.g., GIS shapefiles). All electronic data should be linkable by a unique survey site and year identifier.

Summarize streamflow and water temperature data in annual reports and provide data to resource agencies in electronic format, preferably in HEC-DSSVue, or Excel. Summarize other environmental and habitat data in annual reports and provide data electronically to resource agencies.

After the first 5 years, the first 10 years, and at the end of each decade thereafter through the end of the license period, compile a summary report comparing survey information from the previous survey period(s).

Other resource areas that will be included in the overall monitoring plan are:

Recreation Monitoring

Monitoring associated with recreation is described in the Recreation measures.

Cultural Resource Monitoring

Monitoring associated with cultural resources will be described in the Historic Properties Management Plan.

Bear Management Monitoring

Monitoring associated with bear management (need for food locker) is described in the Recreation measures.

Wildlife Crossing Placement and Effectiveness

Ten years following license reissuance, and every ten years thereafter, Licensee shall arrange a meeting with FS, BLM, and CDFG, to review the location and design of Licensee-maintained crossings and natural landscape features that provide wildlife passage across Licensee's conduits, in context with changes in land use patterns, human development, and road improvements or decommissioning, that may affect wildlife use of crossings. As identified by FS, BLM, and CDFG, Licensee will develop additional plans to address additional needs for crossings, exclosures, and escape structures, to be submitted to the Commission for approval.

Condition 24 – Dutch Flat Afterbay Large Woody Debris

Within 1 year of license issuance, the Licensee shall, in consultation with FS, BLM, CDFG, and State Water Board, prepare a Large Woody Debris (LWD) Management Plan for Dutch Flat Reservoir approved by BLM. The Plan will specify:

- Describe existing locations of LWD collection by Project facilities.
- Describe potential options for moving LWD below Project facilities and keeping the LWD within the river corridor.
- Identify suitable locations where LWD can be placed within the active channel to be mobilized by 2- to 5-year high flow events.

Upon Commission approval, the Licensee shall implement the Plan.

Condition No. 25 - Slope Assessment and Facility Release Plan

Licensee shall, within 1 year after license issuance, file with the Commission a plan developed in consultation with FS, BLM, CDFG, and State Water Board and approved by FS as follows:

- Assessment of landslide hazards by a qualified engineering geologist for slopes above and below open sections of canal and other project facilities. Based on this assessment, conduct slope stability analysis in locations that are considered moderately to highly unstable.
- Assessment of past canal breach areas to determine erosive condition of slopes below these areas. Make recommendations to repair erosive areas that have been damaged by breaches of canal system.

- Conduct an assessment of penstock and other drainage structure emergency and maintenance release points to determine if improvements can be made to minimize potential adverse resource impacts when the release points are used. Consider information collected in the landslide hazard and erosive condition assessments described above when setting priority release points.
- The plan shall include proposed measures to prevent or reduce the risk of slope failures due to project facilities and operations

Licensee shall implement the plan upon approval.

Condition 26 – Recreation Plan

A Recreation Plan was provided in the Final License Application. Some progress has been made on updating this plan since the Final License Application was filed. The Licensee will, in consultation and coordination with FS, BLM, and CDFG finalize a Recreation Plan and submit for FS, BLM, and CDFG approval. Once the plan is complete, it will be included as part of this condition.

To assist the Licensee in developing a final Recreation Plan for BLM approval, the following elements that should be addressed in the Recreation Plan are provided: Condition No. 28 Licensee Contact, Condition No. 29 Annual Recreation Coordination Meeting, Condition No.30 Review of Recreation Developments, Condition No. 31 Recreation Survey and Monitoring, Condition No. 32 General Measures For All Recreation Sites, Condition No. 33 Vegetation Management in Recreation Sites, Condition No. 34 Dutch Flat After Bay Day Use Recreation Site, Condition No. 35 Chicago Park Power House and Connecting Facilities and Roads, Condition No.36 Recreation Operation, Maintenance, and Administration, Condition No. 37 Recreation Plan Revision.

Condition 27 – Licensee Contacts

The licensee shall provide an individual for liaison with BLM, whenever planning or construction of recreation facilities, other major Project improvements, and maintenance activities are taking place on BLM lands. The licensee agrees to cooperate with BLM through this individual in contract review and work inspection.

Condition 28 – Annual Recreation Coordination Meeting

Each year during the term of the licenses, licensee will arrange to meet with interested resource agencies (FS and BLM at a minimum) for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure public safety, and protection and utilization of the recreation facilities listed in of this Plan. The date of the meeting will be mutually agreed to by licensee and the resource agencies but in general will be held within the first 90 days of each calendar year. A detailed agenda will be provided to the resource agencies when the meeting date is proposed to assure that the appropriate parties are present.

The following will be discussed, at a minimum:

- Need for garbage collection based on the results of visitor surveys, evidence that wildlife is becoming habituated, and the status of garbage and litter left on site by users.
- Need for toilet facilities where dispersed camping is occurring will be discussed at least every 6 years (following submittal of Monitoring Report), and more frequently if warranted.
- Status of recreation projects from the previous year, including rehabilitation of existing recreation facilities, the establishment of new recreation facilities, and any other recreation measures or programs that were implemented.
- Recreational use data that is available.
- List of the recreation facilities scheduled for rehabilitation and any other Plan measures or programs to be implemented, including
 - Logistical and coordination planning
 - Implementation schedule
 - Coordination needs.
 - Permitting requirements.
 - Key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects.
 - Potential adjustments in schedule.

The Annual Coordination Meeting is a minimum requirement; it is anticipated that meetings will occur throughout each year as needed to implement the Recreation Plans. Any adjustments in specific actions or schedules shall be approved by FS and filed with the Commission.

Condition 29 – Review of Recreation Developments

The licensee shall schedule a meeting with BLM at least every 6 years to review all Project-related recreation facilities and agree upon necessary maintenance, rehabilitation, construction, and reconstruction work needed and its timing. Because the standard life of recreation facilities ranges from 20 to 30 years, it is anticipated that during the life of the license, facilities that are currently in good condition may need to be redesigned and reconstructed to standards applicable at that time. The criteria for project selection will depend on the amount and type of use, current recreation facility policy, condition of facilities, effects on surrounding areas, and other factors. Following the review, the licensee shall develop a 6-year schedule for maintenance, rehabilitation, and reconstruction, which shall be approved by BLM prior to being filed with FERC.

Condition 30 – Recreation Survey and Monitoring

- Licensee shall conduct Recreation Monitoring once every 6 years that will include evaluation of resource impacts from developed and dispersed use, including evidence of garbage and human waste left on site. BLM shall be involved in the evaluation of resource impacts.

- Licensee shall conduct occupancy surveys of all project facilities on a 6-year cycle for Dutch Flat Afterbay and the Chicago Park Recreation Area near Chicago Park Power House.
- Licensee shall conduct a Recreational User Survey (questionnaire) once every 12 years starting from license issuance. Survey methods and questions shall be reviewed and approved by the resource agencies in advance. The Recreation Survey shall be focused to address the key issues at the time. Survey information shall be reviewed by all interested parties.
- At 6 and 12 years after license issuance, Licensee shall prepare the Recreation Monitoring and Survey Report and shall be provided to BLM for review, comment, and approval prior to filing with the Commission. The Recreation Monitoring and Survey Report shall incorporate data from the information listed above, traffic counters, other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, Project Patrol reports, occupancy rates and other applicable information. The 6-Year Monitoring Report shall address, at a minimum, the following factors:
 - Occupancy and capacity information.
 - Summarize monitoring results in relation to established triggers and address any changes in trends (including changes in peak season) since previous reports (or initially from relicensing studies).
 - User and resource conflicts.
 - Outstanding health and safety issues.
 - Known bear encounters at sites without food lockers.
 - Kinds and sizes of recreational vehicles (i.e. trailer, RV).
 - A 6-year schedule for maintenance, rehabilitation, reconstruction and new construction.
 - Proposed facility changes based on any mandated updated guidelines, such as ADA.
 - New or modified management actions (increased patrols, additional sanitation facilities, closure orders, etc.) proposed to address concerns identified in report.
 - Summary of the amount of garbage and evidence of human waste noticeable within 100 feet of dispersed campsites and concentrated use sites.

The 12-Year Monitoring Report shall address, at a minimum, the following factors:

- All the items in the 6-Year Monitoring Report,
- Results of visitor surveys.
- Changes in use type, volume, group size, duration of stay, other use pattern and trends.
- Results of resource survey for riparian and lakeshore trampling, barren core area at popular dispersed sites.
- User perceptions of crowding both at facilities and along lakeshore/lake surface.
- User perceptions on the need for garbage collection at developed sites.
- Percent of users seeing evidence of human waste (including toilet paper) and user perceptions on the need for toilet facilities at dispersed sites and concentrated use sites.

- Kinds, quality, quantity, and range of recreational opportunities visitors are engaging in.
- Preferences in recreation activities and amenities.
- Summarize the most current regional and statewide trends in recreation based on available surveys and reports.

Within 1 year of submission of the Report on Recreation Resources Licensee shall consult with the resource agencies and interested parties to review this report and propose appropriate management actions. In accordance with (Condition No 43), BLM reserve the authority to require changes in the Project and its operation to accomplish protection and utilization of BLM resources identified as a result of these surveys.

Condition 31 – General Measures For All Recreation Sites

Routine Recreation Facility Maintenance

The Licensee shall ensure that the following routine maintenance occurs at Project recreation facilities on BLM lands:

- At the beginning of each recreation season, and as needed throughout the season, replace, reset, improve, straighten, and reinstall barriers within and adjacent to all project recreation sites; along the roads surrounding Project lakes, and along Project roads and trails where there is uncontrolled vehicle use.
- If tables have sunk during the winter due to snow loads, they will be brought up to the level of the surrounding ground and placed on level ground.
- Maintain all recreation facilities in good working order. This includes keeping toilet doors and hardware in operating and locking conditions. If a structure is deemed to be unsafe, it will be closed until repairs are completed.
- Developed sites will be free of litter, human, and domestic animal waste.
- During the prime season all facilities will be inspected on a regular basis (as much as daily or more).
- Litter and Trash Collection shall of a frequency that does not encourage animal encroachment, is not overflowing and does not emit offensive odors. . The frequency will depend on the type of container. Two to four-yard dumpsters need to be dumped at least once a week. Receptacles shall be animal resistant.
- Ashes are to be removed from fire rings and grills, cooled and extinguished and disposed of at a county landfill. Ashes are not to be disposed of onsite and ashes which have been previously disposed of onsite (including those disposed of onsite by users) shall be properly disposed of as described above.
- Developed boat ramps will be inspected for obstacles and deterioration.
- Once a facility has been rehabilitated to provide for accessibility, clear floor space surrounding constructed features, graded tent pads and ORA R shall be maintained.
- Rocks removed from unauthorized fire rings should be turned burned side down outside of campsite.
- Remove trash from toilet vaults when pumped.

- Remove trash from (road accessed) dispersed sites on a weekly basis between Memorial Day and Labor Day and twice monthly after Labor Day, until the facilities are closed for the winter. Remove trash from non-road accessed dispersed sites on a monthly basis between Memorial Day and Labor Day.
- Annually maintain fire ring clearances at designated dispersed sites (10' diameter to bare mineral soil and 10' clearance above fire ring) and maintain site identification markers.
- Within and adjacent to all developed project recreation sites, provide for periodic silvicultural evaluation, stand improvement, view enhancement and vegetative planting work to identify unseen hazard trees, assure stand health, provide for screening within & between sites and enhance views of project lakes and other scenic features.
- Every 2 years inspect all fire rings, maintain in good condition or replace. Good condition includes a level grill with a usable grate.

Condition 32 – Vegetation Management in Recreation Sites

The Licensee shall ensure that vegetation management, including but not limited to hazard tree and branch removal, vegetative screening, brushing, or pruning occurs at Project recreation facilities located on BLM lands. The Licensee shall ensure that the following vegetation management elements occur:

- Hazardous trees or branches must be actively searched for and identified by qualified personnel (Land Management Planners, Foresters, Arborists) and removed in a timely manner. In early spring, a qualified person will survey developed recreational facility boundaries, parking lots and immediate access routes to recreation areas for hazard trees and hazardous branches. Identified trees are to be removed before the campgrounds are occupied by the public. If time allows, hazard tree clearing should be conducted in the late fall to remove the bulk of the trees ahead of the spring camping rush.
- For visual mitigation stumps remaining within developed campgrounds shall be no higher than 6".
- The slash from hazard tree/branch removal will be chipped or lopped and scattered (<18" depth) at least 100 feet away from the recreation site boundary, and the trunk is either hauled away or cut into rounds no larger than 8" diameter and 18" long for use by campers. Larger rounds will be removed from the recreation site or split into firewood size pieces and stacked for use by campers.
- All freshly-cut conifer stumps within 2 hours after the tree is felled will be treated to prevent the spread of Annosus Root Disease. In no case shall stumps be left untreated at the end of the shift during which the tree was felled. The BLM approved stump treatment compound, when applied properly, should cover the entire stump surface with a thin layer and also other areas of the stump where the bark has been knocked off. Where a liquid stump treatment compound is used, the spraying of a thin film of the solution on the stumps surface is all that is needed. A dye, mixed in with this solution, is useful to show where stumps have been sprayed. Handling directions are provided on the labels of stump treatment product containers and should always be followed. Only pesticides registered in California can be used on BLM lands, and all BLM policies and practices and California regulations relating to pesticide use must be followed. To avoid adverse effects to aquatic species and their habitats, the licensee will work with

the Federal Agencies regarding pesticide use within recreational facilities that are within 500 feet of aquatic habitats.

- The licensee will maintain 5-foot clearance radius to bare mineral soil around all fire rings, and remove overhanging branches to a height of 10 feet. This includes fire rings within developed recreation sites and those located at dispersed sites. Because wildfires do not stop at land ownership boundaries, fire ring clearance standards need to apply to BLM and Licensee lands.
- During new construction and reconstruction work, the licensee will use care to protect existing vegetation through the incorporation of the Construction Specification Institute (CSI) Section 02233 – Tree Protection, or other specifications that provide equal or better vegetation protection.

Condition 33 – Dutch Flat After Bay Day Use Recreation Site

Within 90 days of license issuance: Licensee of the Yuba Bear Hydroelectric project will make a good faith effort to purchase at fair market value the parcel of land described below, or obtain a long-term lease or easement for use of such property for Day Use recreational activities that will include parking for 6 vehicles, 6 picnic tables, kiosk sign, and a restroom facility. Property of interest is Parcel Number: Placer County, 062-040-019 The size of this area needed for developing the Day Use Recreation site is the property from Diggins Hill Road to the shore of Dutch Flat Afterbay approximately 5 acres in size. If the property cannot be purchased at fair market value or the licensee was not able to secure a long term lease or easement within the first three years of license issuance from the private landowner then the licensee must provide a good faith effort to work out an agreement with the Licensee of the Drum Spalding Hydroelectric Project (PG&E) so the Licensee of the Yuba Bear Hydroelectric Project can develop, maintain, and replace when necessary a Day Use Recreation facility on PG&E property. Licensee of the Yuba Bear River Hydroelectric Project must be able to demonstrate that a good faith effort has been attempted by documentation of all conversations, correspondence, emails, etc... to the owner of said property of interest.

Condition 34 – Chicago Park Power House and Connecting Facilities and Roads.

Within one year of license issuance licensee will sign an Assistance agreement with BLM and develop a Rehabilitation plan with the BLM Mother Lode Field Office to block, gate, and rehabilitate roads and trails agreed to by the licensee and BLM that spur off of the Haul Road, Chicago Park Powerhouse Road, Chicago Park Conduit, and Lowell Hill Road. Licensee will provide the man power and equipment and materials for each approved project. BLM will provide the NEPA work required for each approved project involving BLM land. Licensee will meet with BLM by November 15th of each year to discuss next year's projects.

Condition 35 – Recreation Operation, Maintenance, and Administration

BLM is working with the Licensee of the Yuba Bear Hydroelectric Project to develop a separate agreement that addresses this condition. Once the agreement is finalized, this condition will be removed. A Condition in the BLM Final License Filing will file a condition on non-payment.

Beginning 90 days after license issuance, the licensee shall enter into a Recreation Operation and Maintenance agreement to provide annual funding in a contributed funds account set up by BLM to provide \$30,000 annually with adjusted GDP-IDP, for operation, maintenance, law enforcement patrolling, and administration in accordance with the Recreation Plan (see Condition No. 27). The cost basis for these payments shall be year 2012. The cost shall be escalated annually based on the U.S. Gross Domestic Product – Implicit Price Deflator (GDP-IDP).

Condition 36 – Recreation Plan Revision

The Licensee shall revise the Recreation Plan when substantial changes occur. Factors that may trigger a revision include but are not limited to:

- Revisions and updates to BLM, or other applicable management plans.
- Substantial changes (>25 percent change) of Recreation Visits in any activity recreationists of the Project participate in, as revealed in the National Visitor Use Monitoring (NVUM) of the using the 2010 surveys as a base), similar survey conducted by BLM or documented in the licensee's periodic observation and recreation survey.
- Documented substantial changes in demographic use patterns (e.g. increases in size or amount of RV use, changes in types of boats using the lake), visitor needs, recreation preferences, types or patterns of use, season of use changes (perhaps due to school schedule changes) or other social factors affecting recreation facilities within the Project area.
- Changes in road maintenance standards or similar physical factors affecting the use of the recreation facilities within the Project area.
- Reaching occupancy (or other) triggers where new, but previously unanticipated, facilities will be required.
- Catastrophic natural events, such as major forest fires or natural disasters, and significant effects of social disorder.
- New federal or state policies, regulations, and laws (including Wilderness designation of land within or near the Project) that significantly affect recreation resources in the Project area.
- Acquisition of non-licensee private land around project lakes which would allow for improvements where there is a demand, but suitable land was previously unavailable for construction of such improvements.

Frequency of revisions to the Recreation Plan shall be based on consultation among the Licensee, BLM. Agreed upon changes to this Plan will be incorporated into a revised document or an amendment to this document, and after approval by BLM, the revised plan will be submitted to FERC for approval.

Condition 37 – Recreation Costs of Managing Facilities

Within 1 year of license issuance, the Licensee shall coordinate with BLM to develop a plan to address the costs of managing the recreation facilities on BLM lands. At the Annual Coordination Meeting, the Licensee shall coordinate with BLM to review information from the

prior season and plan any adjustments for the next recreation season. This component shall address, at a minimum, the following duties:

- Monitor and seek compliance with safety, camping closures, fire clearance, and other measures.
- Patrol, or provide for patrols, on weekends and holidays through the peak use season (Memorial to Labor Day) with personnel that have the ability to put out abandoned campfires.
- Patrol, or provide for patrols, on weekends and holidays through the peak use season (Memorial to Labor Day) with personnel that have the authority to enforce federal 43 CFR 43 regulations on BLM lands.
- Install and maintain signs; adjust as seasonally needed.
- Disperse information to the public including appropriate OHV and firearm use, campfire safety, leave no trace, and other messages to reduce resource impacts and inter-user conflicts.
- Patrol dispersed public use areas within one-quarter mile of all Project and Project- affected waterways.
- Monitor and report vandalism of facilities, cultural sites or other resource damage.
- Report illegal activities and cooperate with law enforcement agencies, as needed.
- Monitor and seek compliance with regulations associated with camping, parking, food storage, whitewater boating, and other uses.
- Remove trash and clean fire rings from dispersed campsites and other areas of concentrated public use within 1/4 mile of all Project and Project-affected waterways.
- Maintain fuels clearance within 100 feet of all dispersed campsites (including Project-provided steel fire rings and user created fire rings) surrounding Project lakes.
- Remove visitor created fire rings in areas where camping is limited to designated sites.

Condition 38 – Historic Properties Management Plan

Within one year of license acceptance, Licensee shall file with the Commission a Historic Properties Management Plan (HPMP) that is approved by BLM. The HPMP will be tiered to an anticipated Programmatic Agreement (PA), to which BLM requested to be signatories, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. The Licensee shall consult with the State Historic Preservation Officer (SHPO), applicable Native American Tribes, BLM, and other applicable agencies during the finalization of the HPMP. Consultation for the finalization of the HPMP shall consist of field (as appropriate) and office meetings.

If, prior to or during ground disturbance or as a result of Project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on BLM lands and Licensee adjoining property, the Licensee shall immediately cease work in the area so affected. The Licensee shall then notify BLM, and shall not resume work on ground disturbing activities until it receives written approval from BLM, as appropriate.

If it deems it necessary, BLM may require the Licensee to perform recovery, excavation, and preservation of the site and its artifacts at the Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by BLM, as appropriate.

Condition 39 – Transportation System Management Plan

Within one year of license issuance, Licensee shall file with the Commission a Road and Transportation Facility Management Plan, approved by BLM, for protection and maintenance of Project and Project-affected roads that are on or affect BLM lands. The Licensee shall consult with BLM, and other affected parties in the development of this Plan. The Licensee shall take appropriate measures to meet applicable BLM Maintenance Levels, Traffic Service Levels, and Road Management Objectives (RMOs). Upon Commission approval, Licensee shall implement the Plan.

Project Roads

Table T1 below contains the Project Roads and Segments that are to be included in the Road and Transportation System Management Plan. Table T1 includes condition ratings, which are from the Licensee Roads and Trails Study. Within 1 year of license issuance, the Licensee shall improve the roads listed in poor condition to meet BLM standards described below.

Table T1 Project Roads

Licensee Road ID Number	Road Name	Forest Service Road ID Number ¹	Ownership (Length may or may not be on entirely on Federal Lands)	Maintenance Level	Condition	Total Length (mi)
YBCPF_001	Chicago Park Forebay Rd	N/A	BLM	N/A	Poor	1.9
YBCPH_001	Chicago Park Powerhouse Access Rd	N/A	BLM	N/A	Good	0.2

Planning and Inventory

At a minimum, the Road and Transportation Plan shall include the following components.

- Map(s) in electronic format compatible with BLM Travel Management Routes and GIS database showing all Project, Project Recreation and Project-affected roads, culverts, bridges, drainages, watering sources, signs, gates, hazards, sensitive resource areas, erosion features, borrow and disposal sites for surplus rock and soil from road maintenance within and adjacent to the FERC Boundary.
- Table(s) in electronic format identifying uses (e.g. recreation, facility access) of the roads and season of operation, BLM road identification number, Licensee's road identification number, ownership, maintenance level, condition, length, road dimensions, surface type, mile posts, and other identifiers.

- An inventory table in electronic format of all road and road facility conditions including any construction or maintenance needs. Identify each Project Roads and identify how and when it will be addressed further. All road/ segments on BLM Lands listed in poor condition shall be repaired within the 1 year of License issuance.
- A Traffic Safety and Signing Component, including an inventory and condition for existing and proposed traffic/road signs and a schedule for sign maintenance for all Project Roads. Include road identification signage consistent with Motorized Travel Management Direction and directional signage that is prominent and clearly guides the public to and from each recreation facility. The directional signs shall be placed as needed to clearly direct people to and from the Project Facilities and may not be solely on Project Roads. The sign component shall be approved by BLM. The sign component shall meet all current MUTCD and BLM requirements;
- Within 1 year of license issuance, Licensee and BLM will review the existing BLM inventory of illegally built user created routes coming off Project Roads or other facilities such as pipelines, ditches, etc. and develop a plan, including a schedule, to rehabilitate and barricade the affected areas.
- Any proposed changes to maintenance levels.

Operation, Maintenance, and Road-Associated Debris

- Develop and submit for BLM approval annual road operation and maintenance (O&M) schedule for Project Roads on BLM lands to comply with BLM standards, specifications, RMOs, BMPs including all state requirements, and Travel Management guidelines;
- Complete normal maintenance activities on an annual basis including: road surface maintenance, repair and replacement of damaged culverts, cleaning debris and rockfall from drainage channels, vegetation removal to allow adequate sight distances, vegetation removal to maintain an open traveled way consistent with BLM standards, etc.
- Develop and implement a Pavement Management System, approved by BLM to economically maintain and extend the life of pavement on Project and Recreation Roads by tracking pavement surface condition and guiding in the schedule of repairs. Include repairs in the annual program of work. Examples of components that will be included in the Pavement Management System are
 - A rating of pavement condition identifying good, fair and poor pavement by a qualified individual
 - Assigning importance ratings for road segments, based on traffic volumes, road functional class, and user demand to guide in priority of work and repairs
 - A schedule of maintenance for good roads to keep them in good condition
- A schedule of repairs for poor and fair pavements
- Describe types of road-associated debris (e.g. native materials such as dirt, rocks, trees, etc.), any acceptable locations on BLM lands where this material can be stored (identify if temporary only or permanent), and measures to control erosion, weed infestation, etc. on these piles. Remove all road spoil piles not currently located at approved sites on BLM lands to a location either off the BLM lands, or to a BLM approved disposal site.
- Include any required limited operating periods (LOP's) for wildlife species and noxious weed prevention provisions in planning and performing maintenance activities.

- Comply with all State and BLM, specifically BLM Mother Lode FO, guidance and direction for prevention and management of noxious weeds on areas that are on or affect BLM lands.
- Comply with all current BLM O&M guidelines.
- Provide for fish and aquatic passage and proper stream function for all stream crossings that are identified as fish habitat areas.
- When replacing culverts and other stream crossings on BLM land, Licensee shall adhere to design guidelines appropriate for the BLM level designation for the road.

Construction and Reconstruction

- Develop a road construction and reconstruction implementation schedule to bring existing roads and associated facilities (i.e. culverts, gates, bridges, crossings, cribwalls, barricades, etc.) into compliance with BLM standards that achieve BLM RMOs and Motorized Travel Management Guidelines for Project Roads. The schedule shall ensure that Project Roads are in compliance with these standards within 5 years of completion of the Plan with roads listed in poor condition to be brought up to standard within year 1 after license issuance and all others by year 5 after license issuance.
- During construction and reconstruction activities, comply with all current BLM O&M.

Monitoring

- Within the first year of license issuance, unless waived by BLM, conduct traffic use surveys approved by BLM. The traffic use survey will be at BLM designated locations on Project Roads. Thereafter, conduct traffic surveys every 6 years (coincident with the Commission's recreation Form 80 schedule) at BLM-specified locations, to determine the number and type of vehicles per day, describe study periods and reporting requirements, and determine use trends. Conduct a minimum of 60 survey days during survey years.
- Conduct a road capacity and use review every 6 years following completion of use surveys, to determine if the roads continue to meet current road management objectives. If BLM determines roads no longer comply, define actions and timelines to correct deficiencies;
- Following annual or periodic monitoring, any roads or bridges found to not meet BLM standards and guidelines requiring work beyond normal O&M shall be identified. This list, along with proposed measures to bring the roads or bridges into compliance, shall be submitted to BLM at least 30 days prior to the Annual Consultation Meeting required under (Condition No. 21), or as needed.

Condition 40 – Fire Management and Response Plan

Within one year of license acceptance, the Licensee shall complete, in consultation with FS, BLM, Cal Fire, potentially affected Tribes, and other interested parties, and approved by FS, a Fire and Fuels Management Plan (FFMP). The plan shall set forth in detail the Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response,

and investigation of fires related to Project operations. Upon Commission approval, Licensee shall implement the Plan.

Minimum components include, but may not be limited to:

- Fuels Treatment/Vegetation Management: Identification of fire hazard reduction measures and reoccurring maintenance measures to prevent the escape of project- induced fires.
- Fire Prevention and Patrol: Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access. Identify water drafting sites and other fire suppression resources.
- Emergency Response Preparedness: Analyze fire prevention needs including equipment and personnel availability.
- Reporting: Licensee shall report any project related fires immediately to FS.
- Fire Control/Extinguishing: Provide FS a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Condition 41 – Erosion and Sediment Control and Management

Within 1 year of license acceptance, the Licensee shall file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with BLM and other interested parties, and approved BLM that will provide direction for treating erosion and controlling sedimentation within the Project and Project-affected BLM lands during the term of the new license. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in the referenced by this condition, unless otherwise agreed to by BLM during Plan finalization. Minimum components include, but may not be limited to:

Erosion Control Guidelines for Existing Project-Affected Areas

- Methods for initial and periodic inventory and monitoring of the entire Project area and Project-affected BLM lands to identify erosion sites and assess site condition for each. Periodic monitoring and inventory will include recording effectiveness of erosion treatment measures, and identification of new erosion sites for the term of the new license.
- Criteria for ranking and treating erosion sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site.
- Erosion control measures that incorporate current standards, follow BLM regulations and guidance (e.g. BLM Sierra RM P, RMO's, BMP's), are customized to site-specific conditions, and approved by FS or BLM, as appropriate.
- Develop and implement a schedule for treatment (e.g. repair, mitigate, monitor) of erosion sites, including a list of sites requiring immediate mitigation and schedule for their implementation.
- Effectiveness monitoring of completed erosion control treatment measures after treatment in order to determine if further erosion control measures are needed. If erosion

control measures are not effective, the Licensee will implement additional erosion control measures approved by BLM, as appropriate, and continue monitoring until the site has stabilized.

- Protocols for emergency erosion and sediment control.
- Process for documenting and reporting inventory and monitoring results including periodic plan review and revision. Documentation shall provide BLM, compatible GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results.

Erosion Control Guidelines for New Construction or Non-Routine Maintenance

Licensee shall develop site-specific temporary erosion control measures for each project to be approved by BLM, as appropriate. These temporary measures will prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent measures.

b. Preliminary 4(e) General Conditions

The following Section 4(e) Conditions include requirements that serve to address the statutory and administrative rights and responsibilities of BLM pursuant to Federal, State, and local laws. These Section 4(e) Conditions should be included in both the YB and DS Projects.

Condition 42 – Consultation

Licensee shall jointly consult with FS; BLM; CDFG; and State Water Board with regard to each agency's jurisdiction and/or land affected by the Project. The date of the joint consultation meeting will be mutually agreed to by Licensee and BLM but in general should be held by April 15, which is prior to the beginning of the recreation season. At least 30 days in advance of the meeting, Licensee shall notify Pacific Gas and Electric Company (PG&E) and other interested stakeholders, confirming the meeting location, time and agenda. At the same time, Licensee shall also provide notice to the: United States Department of Agriculture (USFS); United States Fish and Wildlife Service (FWS); (USDI) National Park Service; United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fishery Service (NMFS),); California State Department of Fish and Game (CDFG); and the State Water Resources Control Board (State Water Board) who may choose to participate in the meeting.

The Licensee shall make available to FS, BLM, CDFG, and State Water Board at least 2 weeks prior to the meeting, an operations and maintenance plan for the year in which the meeting occurs. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Project area, including progress reports on other resource measures. The goals of this meeting are to share information, mutually agree upon planned maintenance activities, identify concerns that BLM may have regarding activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate potential effects. In addition, the goal of the meeting shall be to review and discuss the results of implementing the streamflow and

reservoir-related conditions, results of monitoring, and other issues related to preserving and protecting ecological values affected by the Project.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions.
- Results of any monitoring studies performed over the previous year in formats agreed to by BLM and the Licensee during development of implementation plans.
- Review of any non-routine maintenance.
- Discussion of any foreseeable changes to Project facilities or features.
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection. Discussion of needed protection measures for newly discovered cultural resource sites.
- Discussion of elements of current year maintenance plans, e.g. road and trail maintenance.
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by the Licensee and shall include any recommendations made by BLM for the protection of BLM land and resources. The Licensee shall file the meeting record, if requested, with FERC no later than 60 days following the meeting.

Copies of other reports related to Project safety and non-compliance shall be submitted to FS, BLM, CDFG, and State Water Board concurrently with submittal to the FERC. These include, but are not limited to: any non-compliance report filed by the Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting BLM lands.

A copy of the record for the previous water year regarding streamflow, study reports, and other pertinent records shall be provided to FS, BLM, CDFG, and State Water Board by Licensee at least 60 days prior to the meeting date, unless otherwise agreed.

Copies of other reports related to monitoring, Project safety and non-compliance on BLM land shall be submitted to BLM concurrently with submittal to the FERC, with the goal of providing the material to BLM no later than 90 days in advance of the annual meeting. These include, but are not limited to: any non-compliance report filed by Licensee, geologic or seismic reports, and structural safety reports for facilities.

During the first several years of license implementation, it is likely that more consultation than just one annual meeting will be required, given the complexity of these projects.

The BLM reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the Section 4(e) conditions to accomplish protection and utilization of BLM lands and resources.

Condition 43 – Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect BLM lands the Licensee shall obtain written approval from BLM prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from BLM, and a minimum of 60 days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of BLM for such changes. The Licensee shall file an exact copy of this report with BLM at the same time it is filed with the Commission. This condition does not relieve the Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition 44 – Maintenance of Improvements on or Affecting Bureau of Land Management Lands

The Licensee shall maintain all its improvements and premises on BLM lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to BLM. Disposal of all materials will be at an approved existing location, except as otherwise agreed by BLM.

Condition 45 – Existing Claims

The license shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

Condition 46 – Compliance with Regulations

The Licensee shall comply with the regulations of the Department of Interior on BLM lands for activities on BLM lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting BLM lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition 47 – Surrender of License or Transfer of Ownership

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to BLM that Licensee shall restore any Project area directly affecting BLM lands to a condition satisfactory to BLM upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such BLM lands and shall include or identify adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall assure that, in a manner satisfactory to BLM, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by BLM to assist it in evaluating the Licensee's proposal,

the Licensee shall conduct an analysis, using experts approved by BLM, to estimate the potential costs associated with surrender and restoration of any Project area directly affecting BLM lands to BLM specifications. In addition, BLM may require the Licensee to pay for an independent audit of the transferee to assist BLM in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition 48 – Protection of United States Property

The Licensee, including any agents or employees of the Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this license.

Condition 49 – Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license.

The Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition 50 – Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the Project works or the works appurtenant or accessory thereto under the license. The Licensee's liability for fire and other damages to BLM lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition 51 – Risks and Hazards on Bureau of Land Management Lands

As part of the occupancy and use of the Project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting BLM lands within the Project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on BLM lands shall be performed after consultation with BLM. In emergency situations, the Licensee shall notify BLM of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not BLM is notified or provides consultation, the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition 52 – Protection of Bureau of Land Management Special Status Species

Before taking actions to construct new project features on BLM lands that may affect BLM special status species or their critical habitat, the Licensee shall prepare and submit a biological evaluation (BE) for BLM approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, BLM may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition 53 – Access

Subject to the limitations set forth under the heading of “Access By The United States” in Condition No. 62 hereof, BLM reserves the right to use or permit others to use any part of the licensed area on BLM lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act

Condition 54 – Crossings

The Licensee shall maintain suitable crossings as required by BLM for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition 55 – Surveys, Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on BLM lands are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of BLM. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition 56 – Pesticide-Use Restrictions on Bureau of Land Management Lands

Pesticides may not be used on BLM lands or in areas affecting BLM lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of BLM. During the Annual Consultation Meeting described in Condition N0.41, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide at a minimum the following information essential for review:

- whether pesticide applications are essential for use on BLM lands;
- specific locations of use;
- specific herbicides proposed for use;
- application rates;
- dose and exposure rates; and
- safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Any pesticide use that is deemed necessary to use on BLM lands within 500 feet of known locations of Western Pond Turtles, Sierra Nevada Yellow-Legged Frog, Foothill Yellow Legged Frog, or known locations of BLM Special Status or culturally significant plant populations will be designed to avoid adverse effects to individuals and their habitats. Application of pesticides must be consistent with BLM riparian conservation objectives.

On BLM lands, the Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by BLM and approved through BLM review for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. The Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other BLM required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition No. 14 Terrestrial Protection Measures. Submission of this plan will not relieve the Licensee of the responsibility of annual notification and review.

Condition 57 – Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

BLM reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

Condition 58 – Signs

The Licensee shall consult with BLM prior to erecting signs related to safety issues on BLM lands covered by the license. Prior to the Licensee erecting any other signs or advertising devices on BLM lands covered by the license, the Licensee must obtain the approval of BLM as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

Condition 59 – Ground Disturbing Activities

If the Licensee proposes ground-disturbing activities on or directly affecting BLM lands that were not specifically addressed in the Commission's NEPA processes, the Licensee, in consultation with BLM, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon BLM request, the Licensee shall enter into an agreement with BLM under which the Licensee shall fund a reasonable portion of BLM staff time and expenses for staff activities related to the proposed activities time and expenses for staff activities related to the proposed activities.

Condition 60 – Use of Bureau of Land Management Roads for Project Access

The Licensee shall obtain suitable authorization for all project access roads and BLM roads needed for Project access. The term of the permit shall be the same as the term of the license. The authorization shall require road maintenance and cost sharing in reconstruction commensurate with the Licensee's use and project-related use. The authorization shall specify road maintenance and management standards that provide for traffic safety, minimize erosion, and damage to natural resources and that are acceptable to BLM as appropriate.

The Licensee shall pay BLM for its share of maintenance cost or perform maintenance or other agreed to services, as determined by BLM for all use of roads related to project operations, project-related public recreation, or related activities. The maintenance obligation of the Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by the Licensee shall be authorized by and shall be performed in accordance with an approved maintenance plan and applicable BMPs. In the event a road requires maintenance, restoration, or reconstruction work to accommodate the Licensee's needs, the licensee shall perform such work at its own expense after securing BLM authorization.

The Licensee shall complete a condition survey and a proposed maintenance plan subject to BLM review and approval as appropriate once each year. The plan may take the format of a road

maintenance agreement provided all the above conditions are met as well as the conditions set forth in the proposed agreement.

In addition, all BLM roads used as Project Access roads (PAR) and Right-of-Way access roads (ROW) shall have:

- Current condition survey.
- Be mapped at a scale to allow identification of specific routes or segments.
- BLM assigned road numbers are used for reference on the maps, tables, and in the field.
- GIS compatible files of GPS alignments of all roads used for Project access are provided to BLM.
- Adequate signage is installed and maintained by the Licensee at each road or route, identifying the road by BLM road number.

Condition 61 – Access By The United States

The United States shall have unrestricted use of any road over which the Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of costs disproportionate to the Licensee's use in comparison to the use of the road by others.

Condition 62 – Road Use

The Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Transportation System Management Plan (Condition No. 40). BLM, as appropriate, reserve the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require construction/construction by the Licensee to the extent needed to accommodate the Licensee's use. BLM agree to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition 63 – Bureau of Land Management Approval of Final Design

Before any new construction of the Project occurs on Bureau of Land Management lands, the Licensee shall obtain prior written approval of BLM for all final design plans for Project components, which BLM deems as affecting or potentially affecting Bureau of Land Management lands within the Project boundary. The Licensee shall follow the schedules and procedures for design review and approval specified in the conditions herein. As part of such written approval, BLM may require adjustments to the final plans and facility locations to

preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by BLM based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed by BLM, FERC, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the license. Any changes to the license made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Interior made pursuant to Section 4(e) of the Federal Power Act to address Project effects within the Project boundary.

Condition 64 – Unattended Construction Equipment

The Licensee shall not place construction equipment on BLM lands prior to actual use or allow it to remain on BLM lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by BLM.

Condition 65 – Maintenance of Improvements

The Licensee shall maintain the improvements and premises on BLM lands within the Project boundary and Licensee adjoining property to standards of repair, orderliness, neatness, sanitation, and safety. For example, trash, debris, and unusable machinery will be disposed of separately; other materials will be stacked, stored neatly, or placed within buildings. Disposal will be at an approved existing location, except as otherwise agreed to by BLM.

Condition 66 – Construction Inspections

Within 60 days of planned ground-disturbing activity on or affecting BLM lands, Licensee shall file with the Commission a Safety During Construction Plan that identifies potential hazard areas and measures necessary to address public safety. Areas to consider include construction activities near public roads, trails, and recreation areas and facilities.

Licensee shall perform daily (or on a schedule otherwise agreed to by BLM in writing) inspections of Licensee's construction operations on BLM lands and Licensee adjoining property while construction is in progress. Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to BLM on a schedule agreed to by BLM. The inspections must specifically include fire plan compliance, public safety, and environmental protection. Licensee shall act immediately to correct any items found to need correction.

A registered professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements on a schedule approved by BLM.

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